

ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES

ANNUAL MANAGEMENT REPORT

-1986-

BRISTOL BAY AREA



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MEMORANDUM

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Date: September 15, 1987

From: Wesley A. Bucher *WB*
Ass't. Area Management Biologist
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Telephone No: 842-5227

Subject: 1986 Bristol Bay Annual
Management Report

The attached report represents our most recent efforts to update and upgrade fishery statistics useful in describing the Bristol Bay salmon and herring fisheries. We believe this report is the most current and comprehensive document available describing and explaining management rationale, as well as providing a single source for catch, escapement and production information on all species of salmon harvested in Bristol Bay during the last 20 years.

The report is not written for the general public as its intended audience. It is distributed only within Department circles with certain exceptions. The 1986 report marks a change in the editorship of the report. Michael Nelson, as Senior Area Biologist in Bristol Bay, has edited this document for the past 11 years. I assumed the responsibility of editor upon his retirement in April of 1987. Please route needed corrections or comments to me here in Dillingham.

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PREFACE

The 1986 Bristol Bay Management Report is the twenty-seventh consecutive annual volume reporting on management activities of the Division of Commercial Fisheries staff in Bristol Bay. The report emphasizes a descriptive account of the information, decisions, and rationale used to manage the Bristol Bay commercial salmon and herring fisheries, while outlining basic management objectives and procedures. We have included all information deemed necessary to fully explain the rationale behind management decisions formulated in 1986. All narrative and data tabulations in this volume are combined under separate SALMON and HERRING sections to aid in the use of this document as a reference source. The extensive set of tables has been updated to record previously unlisted data for easy reference. Fisheries data in this report supersedes information in previous reports. The report is written for Inter-Departmental Use Only.

Corrections or comments should be directed to the Dillingham area office, Attention: Editor.

Wesley A. Bucher
Ass't. Area Management Biologist
Dillingham

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ANNUAL MANAGEMENT REPORT
BRISTOL BAY SALMON FISHERY

1986

INTRODUCTION

The Bristol Bay area includes all coastal waters and inland drainages east of a line from Cape Newenham to Cape Menshikof and is the largest sockeye salmon producing region in the world (Figure 1). Bristol Bay also produces substantial returns of other salmon species and the Togiak herring fishery has developed into the State's largest sac roe fishery.

The area wide salmon catch during the 1986 season was 17.7 million fish of all species (Table 24). The estimated catch of 108 million pounds was valued at over \$142 million to participating fishermen, the highest exvessel value ever recorded for the Bristol Bay salmon fishery, and the fourth consecutive year that the exvessel value has exceeded \$100 million. Sockeye salmon dominated the commercial harvest, and totaled 15.9 million fish (Table 4).

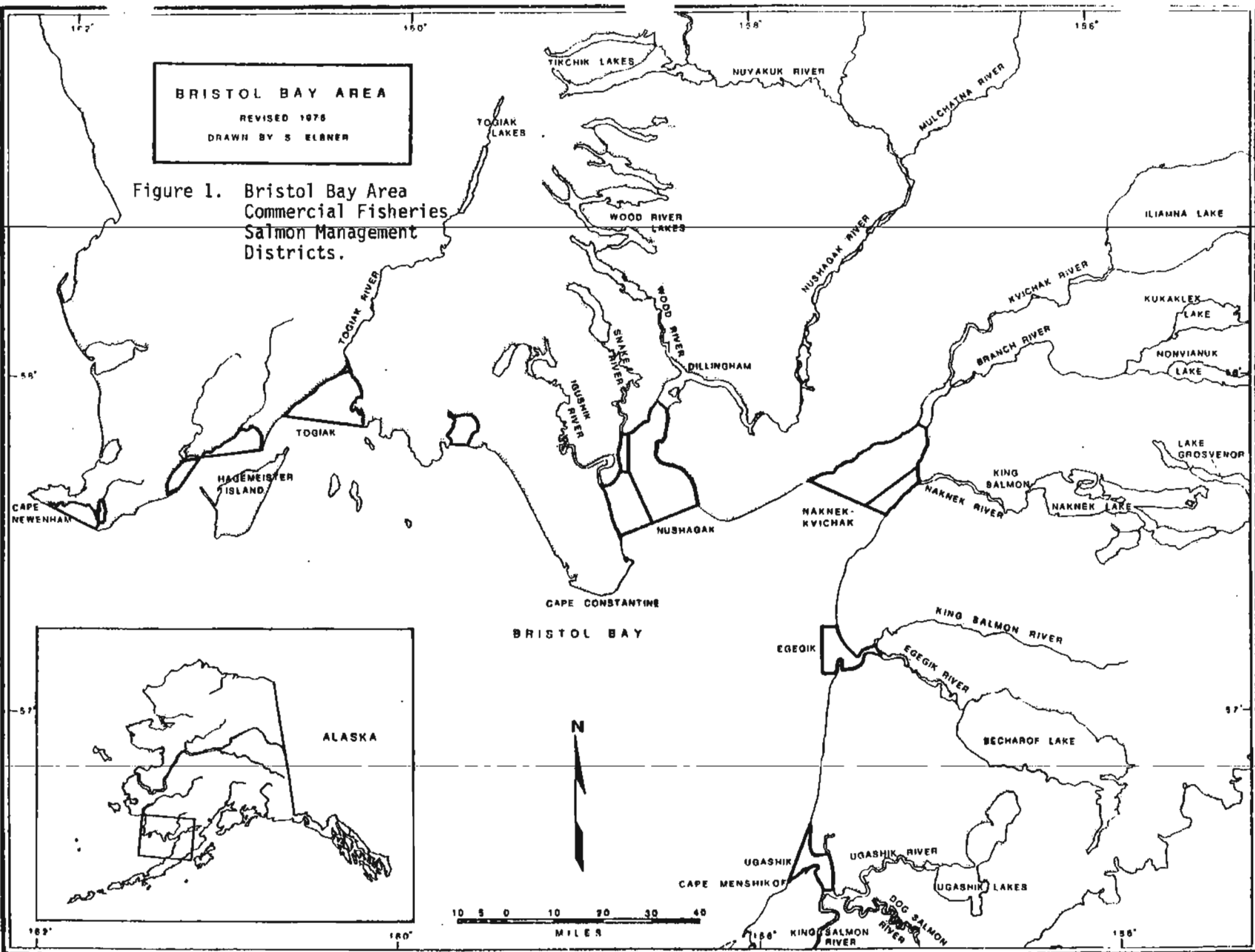
The management objective for all districts in Bristol Bay is the achievement of escapement goals for major salmon species while at the same time allowing for an orderly harvest of those fish surplus to spawning requirements. Sockeye salmon escapement objectives were met in 1986 in all river systems where spawning requirements have been defined, except the Kvichak River, where only 24% of the objective was met, despite a season-long closure of the Kvichak Section (Table 1). Returns of king, pink, and coho salmon were all below expectations, and recent year run totals. Fishing schedules were reduced in all districts to improve the escapement of those species, but most systems fell short of the indicated optimums.

BRISTOL BAY AREA

REVISED 1976

DRAWN BY S. ELNER

Figure 1. Bristol Bay Area
Commercial Fisheries
Salmon Management
Districts.



FISHERY RUN STRENGTH INDICATORS

Inshore Preseason Forecast

A total of 22.5 million sockeye were forecast to return to Bristol Bay in 1986 (Table 1). Generally, returns to east side districts were expected to be high with the exception of the Kvichak River, while returns to west side districts were expected to be average.

The total projected sockeye salmon harvest for 1986 was 13.3 million (Table 1). Returns were expected to exceed spawning escapement goals for all river systems except the Kvichak. The 1986 total run forecast was the weighted mean of the results of two independent forecast methods:

1. Standard ADF&G (based upon spawner-recruit relationships, sibling age class returns, and smolt production-survival estimates for individual age classes and river-lake systems); and
2. Japanese Gill Net Catches (based upon immature sockeye salmon mean catch per unit of effort and length of immature sockeye salmon reported by Japanese research vessels fishing south of the Aleutian Islands in July, 1985).

These methods produced the following results, which in turn, were pooled to produce a final weighted composite forecast (in millions of fish).

<u>Method</u>	<u>Estimate</u>
Standard ADF&G	23.7
Japanese Gill Net Catches	19.1
Composite Weighted Average	22.5

The Japanese Research Catch method produced a slightly greater two-ocean age group prediction (13.7 million) and a much lesser three-ocean age group prediction (5.4 million) than the Standard ADF&G method (11.9 and 11.8 million two-ocean and three-ocean returns, respectively).

Differences in total and ocean age group predictions between the Standard ADF&G and Japanese Research Catch methods were difficult to reconcile since the past performance of both methods, indicated by their standard errors, was similar. The final weighted pooled forecast of total returns was 22.5 million sockeye salmon, with an 80% confidence interval of 15.1 to 29.9 million. Total projected harvest was 13.3 million sockeye salmon, with an 80% confidence interval of 7.5 to 20.2 million (assuming the proportion of the total run returning to individual systems remained constant for total run sizes within the 80% confidence interval).

The total forecast based upon the Standard ADF&G method was only 24% greater than that based upon the Japanese Research Catch method. Since past performance of the Standard ADF&G method has been somewhat better than that of the Japanese Research Catch method, the pooled forecast most closely resembled the Standard ADF&G estimate. Inconsistencies between the two methods, as well as among component models within the Standard ADF&G method, indicate that the most likely deviations from the pooled forecast for most systems would be greater than predicted two-ocean returns and less than predicted three-ocean returns.

Japanese High Seas Fishery

Since 1974 the Japanese high seas mothership gill net fishery has seen a decreased high seas exploitation rate of Bristol Bay sockeye, brought on by bilateral negotiations between Japan and the United States and through renegotiation of the INPFC treaty. The high seas mothership catches were significantly reduced in 1986 (Appendix Table 3).

In March of 1986 the United States, Canada and Japan reached a new agreement concerning the high seas interception of North American origin salmon. In addition to time and area provisions, the new agreement also contained additional language concerning research and enforcement.

Negotiations began in June of 1985 on the salmon interception issue, following evidence that Japan's high seas interceptions were more than previously known. Under the terms of the recent agreement, Japan's mothership fishery will be completely phased out of the Bering Sea (where the interception of western Alaskan salmon is greatest) by 1994, and the fishery's effort within the U.S. 200-mile zone will be capped at the average of recent years. The land-based Japanese fishery will be moved westward by one degree (45 miles) to 174 degrees East, and a greatly enhanced cooperative enforcement program will be initiated to ensure that landbased vessels do not operate beyond the new boundary.

The research program involves a three to five year effort by the three nations to learn the origins of the 1986 salmon and will form the basis, if necessary, for additional talks on further movement of this fishery's eastern boundary.

A first analysis of the agreement suggests that it will lead to an overall reduction in interceptions of North American salmon by 20-30%. There will also be a 50% saving of king salmon because of the phaseout in the central Bering Sea and the early season closure in the U.S. zone after 1993. Interceptions of western Alaska chum salmon will be almost completely eliminated.

The results of this agreement were immediately visible in the reduced harvest this season. The mothership high seas gill net preliminary catches in 1986 totaled:

Sockeye	- 0.7 million (lowest catch since records became available in 1957).
King	- 60,000 (lowest in last 25 years)
Chum	- 1.9 million (lowest catch since records became available in 1957).
Pink	- 0.4 million (lowest catch since records became available in 1957).
Coho	- 65,000 (lowest catch since records became available in 1957).
Total	3.2 million (lowest catch since records became available in 1957).

The annual commercial harvest of coho salmon taken on the high seas by the Japanese mothership and land-based gill net fleets normally varies from 1 to 5

million. The continent of origin of these coho are largely unknown, but a cursory evaluation of recent catch data suggests that there may be a direct relationship between coho salmon catches by the Japanese mothership fleet and Bristol Bay commercial catches in the same year.

South Unimak/Shumagin Fishery

Preliminary data indicates that the South Unimak/Shumagin Island intercept fisheries landed 466,000 sockeye salmon of North Peninsula/Bristol Bay origin in 1986 (Appendix Table 54). The inseason development of the Unimak/Shumagin June intercept sockeye fishery is closely monitored by Bristol Bay fishery managers as an indication of migration timing, relative abundance, age composition and fish size of the incoming Bristol Bay run. These intercept fisheries were again managed under a guideline quota harvest policy originally adopted in 1974 by the Alaska Board of Fisheries to prevent over harvest of sockeye runs to individual river systems in Bristol Bay. In 1986, the Alaska Board of Fisheries placed additional restrictions on the South Unimak and Shumagin Islands fishery. These restrictions were deemed necessary to protect anticipated weak runs of fall Yukon chum salmon.

1. A 400,000 ceiling was placed on the number of chum salmon that could be taken.
2. No fishing was allowed prior to June 11. Consequently, there was only one day in which the June 1-11 sockeye guideline harvest levels could be taken.
3. No fishing was allowed during the June 26-30 period, and the sockeye guideline harvest level during this period was eliminated.

The 400,000 chum salmon ceiling applied to both fisheries (South Unimak and Shumagins) as one. Other provisions in the management plan included: the amount of fishing time allowed during any week and the number of hours allowed for an individual opening.

Although the sockeye catch quota was nearly reached in the Shumagin fishery (153,000 of 156,000 quota), the actual harvest in the South Unimak fishery (313,000) fell well below the quota (771,000). The reduced catch at South Unimak was probably the result of several factors: (1) run timing - the Bristol Bay sockeye run exhibited late run timing, and it is likely that the majority of sockeye passed by the two intercept fisheries after the season closure on June 25; (2) offshore distribution - offshore winds could have affected availability of sockeye; (3) poor fishing weather adversely affected catchability in 5 of the 8 scheduled fishing periods; and (4) chum catches - high initial chum salmon catches led to requests (by fishermen) to curtail scheduled periods.

Catch sampling analysis of the South Unimak/Shumagin's fishery indicated a shortage of 2-ocean sockeye, and sampling within Bristol Bay of both the catch and escapement continued to further document a shortage of age 4(2) and 5(3) sockeye. A comparison of preliminary age data is shown below:

Category	Age Class in Percent					
	4(2)	5(3)	2-Oc.	5(2)	6(3)	3-Oc.
<u>ADFG Forecast</u>						
Standard	15	35	50	29	21	50
Pooled	17	39	56	25	19	44
South Unimak/Shumagins 1/	10	30	40	42	18	60
<u>Bristol Bay</u>						
Catch	13	28	41	45	14	59
Escapement	14	21	35	49	16	65
Total Run	13	26	39	46	15	61

1/ Mixed purse seine/gill net.

Using a model that was developed in 1985, two forecasts of sockeye run strength were issued on June 26 based on CPUE of the combined S. Unimak gillnet/purse seine fishery (22.2 million) and the "relationship between the S. Unimak/

Shumagin sockeye catch as a percent of the inshore Bristol Bay and the catch of chums" (13.5 million).

As a relative indication of run size, this model shows promise and could help to supplant the Port Moller test fish operation which was terminated after the 1985 season due to lack of funding.

FISHERY HARVEST POTENTIAL

Formal total run forecasts for salmon species returning to Bristol Bay other than sockeye and Nushagak and Togiak king salmon are not generally available, because long-term escapement data are limited for these species. However, catch projections are calculated based on relative estimates of parental run size, average age composition data, and recent relative productivity patterns. Catch potential and actual harvests for all species in 1986 were as follows:

Species	Harvest in 1,000's of Fish	
	Potential	Actual
Sockeye-----	13,343	15,889
King-----	150	92
Chum-----	900	1,132
Pink-----	4,000	394
Coho-----	150	184
Total	18,643	17,691

Due to the low expected volume of sockeye and the increased demand for frozen product, many of Bristol Bay's canneries did not operate in 1986. Only five plants canned salmon and a total of five 1-lb., nine 1/2-lb., and one 1/4-lb. lines were in production (Table 39). In addition to the land-based canning operations, 40 companies operated in Bristol Bay in 1986 in the fresh export, brine or refrigerated sea water (RSW) export, frozen and cured salmon marketing areas (Table 39). A total of 48 processors/buyers reported catches in Bristol Bay in 1986 compared with 59 in 1984 and 1985, 62 in 1983 and 72 in 1982.

FISHERY ECONOMICS AND MARKET PRODUCTION

Unlike many seasons when price disputes delayed or virtually tied up the entire fishery until an agreement was reached, 1986 price negotiations were concluded early in June and no fishing time was lost. With the large increase in floating processors and the considerable number of individual agreements with small groups of fishermen, many different prices were established for the five salmon species in Bristol Bay. As the season progressed and it appeared that the run might return below forecast, the price began to rise. By early July most of the major processors were paying \$1.50 per lb. for sockeye, with some of the cash buyers paying as high as \$1.65 per lb. Because prices changed over time, and due to the variability between companies, it was very difficult to establish a final price by species for the 1986 season. After weighting the catch by company, using the data provided on the final operations reports (Form BB-CF/303), it was estimated that the following prices were the averages paid in 1986: sockeye \$1.42 per lb., king \$1.03 per lb., chum \$.31 per lb., pink \$.15 per lb., and coho \$.68 per lb. This was the highest price ever paid for sockeye in Bristol Bay (Appendix Table 45) and resulted in a record exvessel value of \$142 million for all species landed (Appendix Table 46).

The increasing trend of salmon production in the frozen processing category continued in 1986. Frozen salmon production in Bristol Bay totaled 84.8 million pounds of all species in 1986, down slightly from 1985 (95.6 million pounds). There was a dramatic decrease in canned production over previous years, due to the shift in emphasis from canning to frozen and fresh markets. The data shown

below compares the percent of total Bristol Bay production of all species by product type since 1978:

Type of Production	Percent of Total Production								
	1978	1979	1980	1981	1982	1983	1984	1985	1986
Canned	63	36	34	38	15	21	38	16	12
Frozen/Cured	12	32	27	36	61	53	47	71	79
Fresh Export	9	18	18	13	21	14	6	9	4
Brine/RSW Export	16	14	21	13	3	12	9	4	5

1986 COMMERCIAL SALMON FISHERY

All five species of Pacific salmon are found in Bristol Bay and are the focus of commercial, subsistence and sport fisheries. The sockeye salmon run is the most significant, but there are also important runs of king, chum, coho, and in even-years, pink salmon. Numerically, based on 20 years of data (1977-86), the average annual commercial catches are as follows: 13.1 million sockeye salmon; 126,000 kings; 935,000 chums, 164,000 cohos, and 1.7 million even-year pink salmon. Subsistence catches average approximately 157,000 salmon per year; mostly sockeye, while sport fisheries operate to varying degrees of intensity on all species of salmon, with most effort directed toward king and coho salmon stocks.

Sockeye Salmon

The estimated midpoint of this year's sockeye run timing, based on Fisheries Research Institute (FRI) Adak/Cold Bay air temperature analysis, was July 3 for Naknek-Kvichak and July 5 for Nushagak. These dates were very close to the historical means for these runs. It was noted that sea surface temperatures were "a bit above average" in the Northern Gulf of Alaska and along the Aleutians,

but were "colder than average" in a broad area of the middle North Pacific. The staff was cautioned that since the ocean distribution of maturing Bristol Bay sockeye extended across both of these regions in early spring, the sockeye may not react uniformly. FRI suggested that Bristol Bay managers plan for normal run timing and advised that the sockeye run could be more protracted than usual.

Run timing of the sockeye run into Bristol Bay was the major issue this season. From preliminary analysis of catch and escapement data, it appears that the Naknek-Kvichak and Nushagak sockeye runs peaked on July 10-12, about 7-8 days later than normal. In-season the possibility of a bimodal run was discussed, and in some districts, the catch was bimodal. However, post season evaluation of escapement patterns do not suggest bimodality, but rather a "building/holding" sockeye run.

The sockeye salmon return to Bristol Bay in 1986 was 23.8 million, nearly identical to the preseason forecast of 22.5 million (Table 1). Sockeye returns to the Egegik, Ugashik and Nushagak Districts were 13% to 22% above forecast while those to the Naknek-Kvichak and Togiak Districts were below forecast by 20% and 24%, respectively.

The sockeye salmon inshore catch of 15.9 million did not break any all time records, but the harvest was well above the previous 20-year average of 13.1 million (Appendix Table 10). Sockeye escapements were achieved in all systems with the exception of the Kvichak River where the escapement of 1.2 million was 3.8 million short of the goal (Table 1).

Actual returns of sockeye compared to forecasted returns in 1986 are presented by river system below:

River System	In Millions of Fish		
	Forecasted Return	Actual Return	Percent Error
Kvichak	4.5	2.0	127%
Naknek	3.2	3.9	- 19%
Egegik	5.4	6.2	- 12%
Ugashik	4.9	5.9	- 18%
Wood	1.7	1.9	- 9%
Igushik	0.7	0.7	0
Nuyakuk	1.4	1.9	- 25%
Togiak	0.5	0.4	24%
Total	22.5	23.9	6%

King Salmon

The total commercial catch of 92,000 king salmon was less than the 20-year (1967-86) average, and was considerably under the recent 10 year (1977-86) average (Appendix Table 11). King salmon escapement in Nushagak District totaled 33,000, far less than the desired goal of 75,000 (Table 28). Nushagak is the only system in Bristol Bay with a defined escapement objective for king salmon. For the second consecutive year the Nushagak king run demonstrated a "holding pattern" within the district until late June and mingled with the incoming sockeye run. With the use of extensive fishery closures, and a restriction on the use of large mesh king gear, the harvest rate was greatly reduced, but the escapement goal was still not met due to the season's weak run. The Nushagak king salmon age composition closely matched the preseason forecast, but the total run was quite low. Both the Nushagak and Togiak total king returns (97,000 and 28,000, respectively) were well below the preseason forecast (183,000 and 39,000). The

Togiak king escapement of 8,000 was less than half of the long-term average of 17,000. King salmon catches and escapements in other districts were also well below recent averages. Concern for the health of the king salmon stocks prompted several proposed regulation changes that will be brought before the Alaska Board of Fisheries and include a reduction of the fishing area in Nushagak and an adjustment of the fishing schedule prior to the emergency order period in all districts.

Chum Salmon

The Bristol Bay commercial catch of 1.1 million chum salmon was well above the previous 20-year average (1967-86), and closely matched the high production of recent years (Appendix Table 40). Escapements to the Nushagak and Togiak systems were 200,000 and 330,000, respectively, while the provisional escapement goal is 350,000 for Nushagak and 200,000 for Togiak.

Early in the season it appeared that an exceptional chum run was developing (large catches in the S. Unimak/Shumagin area and heavy catches in Nushagak-Togiak, the Bay's major contributors), but as the season progressed, the chums did not demonstrate mid-to-late season strength. In Nushagak District, 67% of the season catch of 462,000 was taken in two 12 hour fishing periods (June 30-July 1 and July 3). Apparently the Nushagak chums displayed the same "holding pattern" as sockeye, and catches dropped significantly after the main body of fish in the district was harvested.

Pink Salmon

The Bristol Bay pink salmon catch totaled 394,000 and was the lowest even-year harvest since 1972 (Appendix Table 41). The 1986 harvest was only 22% of the long-term average (1967-86) and a mere 15% of the recent 10 year average (1977-86). The

Nushagak District produces an average of 84% of the pink salmon landed in Bristol Bay, followed by the Naknek/Kvichak District, which produces 14%. Pink salmon are a targeted species in the Nushagak District but the Kvichak catch is often taken incidentally in larger gear while fishing for chum and coho salmon. This year was the exception and the total pink catch and escapement totaled 981,000, with the larger portion, 53% from the Naknek/Kvichak and only 36% from the Nushagak District.

Coho Salmon

Commercial interest in the Bristol Bay coho run continues to build and as this interest and fishing effort expands, the Department will need to develop more inseason escapement techniques to manage this resource. The 1986 commercial catch totaled 184,000, with the majority landed in the Nushagak and Togiak Districts (Table 23). The Nushagak District, which produces over 48% of Bristol Bay's coho harvest, was closed on August 5 and did not reopen due to the weak run. Nushagak District is the only system where the Department has a method (sonar) to measure inseason escapement. Escapement past the Nushagak sonar site was 53,000 cohos, and with a catch of 73,000, equaled a total run of 126,000 (Appendix Table 43). The provisional escapement goal of 150,000 was not met in Nushagak, even though the fishery was closed early in the season at the 53% point of the average run to this district. Fishing time was reduced to three days per week in the Togiak District resulting in a harvest of 48,000 and an estimated escapement of 30,000 for the Togiak and Kulukak Rivers (Appendix Table 43).

The Egegik and Ugashik areas saw a reduced fishing schedule this season in an effort to reduce the exploitation rate and to increase coho escapement. The Ugashik District was later closed due to the extremely poor coho run to that

district. This year's poor coho return was not unexpected, as Japanese mother-ship coho catches were reportedly very low and suggested a poor run.

Aerial surveys were conducted in the Togiak, Egegik, and Ugashik Districts, and preliminary data indicates escapements of 30,000, 13,000, and 8,000, respectively. Limited coho returns in recent years, and a large, efficient fishing fleet have resulted in long closures in some districts to achieve desired escapement. A proposed regulation change to reduce fishing time after the emergency order period will be brought before the Alaska Board of Fisheries in an attempt to better balance the fleet with the available resource.

1986 DISTRICT INSEASON MANAGEMENT SUMMARIES

Naknek-Kvichak District

The 1986 sockeye salmon run to the Naknek-Kvichak District was 6.3 million, 80% of the forecasted 7.9 million (Table 1). The Kvichak River run totaled 2.0 million, which was 44% of the forecasted 4.5 million, and the escapement goal was set at 5.0 million for 1986 with a management range of 4.0 to 6.0 million. The actual Kvichak escapement of 1.2 million, while the harvest was 787,000. The Naknek River run totaled 3.9 million, 23% above the preseason forecast with a 2.0 million escapement and 1.9 million catch. The Kvichak Section remained closed during the entire emergency order period while the Naknek Section was reduced in area when commercial fishing was allowed. A special harvest area in the Naknek River was established by the Board of Fisheries for the 1986 season and its use was instrumental in harvesting excess Naknek River fish that otherwise would have escaped during district closures aimed at protecting the weak Kvichak River run.

The management plan for the Naknek-Kvichak District called for a very conservative approach during the 1986 season, and was based on a Kvichak River forecast that was less than the escapement goal and a Naknek River forecast that allowed for a potential harvest of some 2.2 million sockeye. The entire district was open to fishing for normal five day per week fishing until June 14 to obtain information that would be used to determine fishing time during the next weekly period. However, effort and catches were so small, no accurate assessment of run strength could be determined and the fishery was allowed to resume June 16. Catches were monitored daily during the weekly period, but no unusual catches were made and the fishery continued through the week.

The South Unimak/Shumagin Island fishery management plan was altered by the Board of Fisheries for the 1986 season, in that no fishing was allowed until June 11 when all of the June 1 - June 11 quota could be taken, and there was a 400,000 chum quota for the year (Appendix H). The 24 hour fishing period at South Unimak on June 11 produced a catch of 7,900 sockeye, and although bad weather precluded purse seining operations, the area biologist reported that gillnet success indicated fish abundance to be low. The second period at Unimak on June 14 produced a catch of 56,000 sockeye and 55,000 chums. The weather was good in the morning, but purse seiners were again blown out in the afternoon. Two more periods (a six hour period on June 16 and a 12 hour period on June 18) with good weather produced catches of 23,000 and 79,000 sockeye, respectively, and chum salmon catches were 33,000 and 86,000 for the same periods. Shumagin catches meanwhile were 4,500, 26,000, 23,000, and 13,000, respectively, for the same open fishing periods. Except for the first opening, the Shumagin Island fleet experienced good fishing weather. Comparing these catches with historical data for the South Unimak and Shumagin Island fisheries, there was no evidence to suggest that the Bristol Bay run would greatly exceed the forecast.

Both South Unimak and Shumagin areas were opened for 12 hour periods on June 21, however, heavy southwest winds kept some purse seiners from fishing at Unimak while others quit fishing early. The Shumagins experienced moderate winds but catches there looked promising with a 23,000 harvest and a 5.7 lb. average. The South Unimak opening produced a catch of 62,000 at an average of 5.6 lbs. Some age data became available on June 17 from catches in the two areas on June 11, which indicated both areas to have almost complete absence of 4 year old fish which had been forecasted to be 17% of the Bay run (Table 2). The 5(3) age class comprised 30% of the samples, much closer to the 39% forecasted. The 5(2) age class was close to forecast, while the 6 year olds were more abundant than forecasted. Both areas were opened again at midnight June 22 and fishing was allowed to continue through June 25. Catches were not that strong and it still appeared that the total run to Bristol Bay would not greatly exceed the forecast.

Run timing information from the Fisheries Research Institute was made available on June 13, and based on water temperatures, the Naknek-Kvichak run was projected to peak on July 3 and Nushagak on July 5. Temperatures north of 59 degrees latitude were found to be warmer than normal while those south of 50 degrees were colder than normal. It also appeared that the Bay run could be drawn out beyond the normal time frame in 1986.

Subsistence nets in the Naknek River were doing fair on June 14-16. The cumulative commercial sockeye catch in the Naknek-Kvichak District through June 16 was 3,500 (Table 13). A survey of the district on June 18 showed an effort level of 63 boats and 129 set nets and very little sign of fish. Catches in the N/K and Ugashik picked up slightly on June 20 and the morning of June 21. The catch through the weekly period ending June 21 was 28,000, far below the long-term average of 160,000, suggesting a total N/K run of about 9.3 million sockeye.

The total run forecast based on catches and CPUE data at False Pass suggested a total Bristol Bay run of 22.4 million. Up to this date age class composition of both the False Pass and Bristol Bay catches showed a definite weakness in the 2-ocean component.

A district test fishing boat was sent out on June 23. Except for a catch index of 205 near the mouth of Naknek River, all other drifts produced low indices (Table 6). The Egegik inside test fishing program began picking up better indices on the low high tide (Table 7). Subsistence nets in the Naknek River made good catches on the morning high tide, but repeated seine hauls at Naknek tower (which was experiencing poor visibility) produced a catch of only six sockeye. Two seine hauls at Naknek tower the morning of June 24 produced a catch of zero. Egegik inside test fishing results dropped back to previous low levels. A N/K District test boat fishing only the Kvichak Section produced very low indices on all drifts. Two more seine hauls at Naknek tower in the afternoon produced only 16 sockeye. False Pass CPUE figures from catches through June 24 indicated a Bay-wide forecast of 15 million with no evidence of late run timing.

A few fish were spotted at Naknek tower on June 25 and a crew was sent to gather samples from the escapement to be used in stock separation analysis (Table 25). Only two sockeye were caught in three seine hauls indicating a lack of escapement at this time. Another district test fishing boat was sent out the evening of June 25. Catches were fair off the mouth of Naknek River, but poor elsewhere. Age analysis of the catch showed a definite lack of 2-ocean fish and a much larger than forecast 3-ocean component. Meanwhile False Pass age composition became available from catches made on June 14-19. These data showed both 2-ocean age classes still below forecast while the 5(2) age class was now much higher and the 6(3) age class was close to that forecast.

In attempts to detect any common trends in age class or abundance observed in other areas, it was noted that: (1) Japanese high seas catches were 140,000 compared to 270,000 during a comparable period in 1985; (2) British Columbia sockeye catches were at about 10% of their forecast and 2-ocean fish Statewide seemed to be at low abundance; (3) district test fishing at Ugashik indicated few fish in the district, while some were present near the outer bell buoy (Table 8). Another small age class sample from the False Pass area became available on June 26 showing a slight improvement in the percentage of 2-ocean fish.

No indications of large numbers of fish were present on June 27. Inside test fish indices were low, tower counts were low, and, except for a few good indices off the mouth of the Naknek River, district test fishing indices were low. Early indications from a commercial fishing period in the Egegik District were that fishing was slow. There were several reports of a large school of fish milling in and out of the Naknek-Kvichak District up as far as "ships anchorage".

Many reports came in on June 28 of jumpers in the "Y" and up to the mouth of the Naknek River, while Naknek tower began counting a few fish. There were reports of good catches in the subsistence fishery from nets near the mouth of the river. In response to these indicators, a district test boat was again sent out the evening of June 28.

There were more reports of large catches in the subsistence nets in the lower Naknek River on June 29, but no significant movement above Leader Creek. The district test boat produced one good index off the mouth of the Naknek River, but extremely low catches throughout the remainder of the district as far south as Low Point. An aerial survey of the district in the afternoon showed two groups of fish, one in the middle of the Naknek Section and another about a mile offshore at Low Point. Naknek tower reported 11,000 fish between 2:00 p.m. and 6:00

p.m., however counts dropped off after that. Travel time between the mouth of the river and the tower appeared to be 16-18 hours.

There was very little action at all three of the east side river test fishing projects. District test fishing in Egegik and Ugashik was also weak. Age composition from the Naknek Section showed 61% 5(2) and 21% 6(3) while the 2-ocean component was a combined 18%. These results were disappointing for both river systems since the Naknek was forecasted to have 48% 2-ocean fish and the Kvichak to have 80% 2-ocean fish. Egegik, meanwhile, showed age compositions of 13% 4(2), 41% 5(3), 27% 5(2), and 32% 6(3). These were above forecast for ages 4(2) and 5(2) and below forecast for age 5(3). A district test boat was again sent out into the N/K District the evening of June 29.

Information gathered on June 30 was not promising although there were reports of jumpers on south Ugashik beach, Middle Bluff, Low Point, Red Bluff, and in the ships anchorage off Naknek River. District test catches were again very low, while Kvichak River test fishing produced only one fish. South Unimak and Shumagin age information became available from the June 23-24 fishery which showed a trend back to the 5(2) age class with a lesser percentage of 2-ocean fish. Information from these fisheries also indicated a total run of 22.9 million to the Bay by one method and 13.5 million by another. A district test boat was again dispatched the evening of June 30. Test fishing results from this trip improved slightly with one large catch in the middle of ships anchorage.

Another test boat was dispatched the morning of July 1 in order to completely cover the district. There was some improvement with small catches in many areas, but good catches only off the mouth of the Naknek River, confirmed confirming reports of a large number of fish in the mouth of Naknek River. A flight at about 3:30 p.m. in a Fish and Wildlife Protection aircraft showed a large number of fish from Savonoski down to the mouth while a survey flight up the

east side of the Kvichak River produced negative results. Subsistence nets at Levelock averaged about two fish per net. A survey of the west side of the Kvichak River down to Nakeen also produced nothing. The flight up the north side of the Naknek River showed no strength while another flight down the south side showed a few jumpers at Savonoski but nothing downriver. The Egegik District test boat produced large indices at Middle Bluff and two miles north of the north Egegik line (Table 7), while Egegik River test fishing indices jumped to over 1,000 on the north bank and 2,000 on the south bank. Reports of jumpers and finners at Savonoski continued until 11:00 p.m.

Naknek tower reported 3,000 past the tower from midnight until 6:00 a.m. and 70,000 from 6:00 a.m. to 10:00 a.m. on July 2. By 6:00 p.m. that evening, 331,000 had passed the tower and there were still large numbers of sockeye in the river. A test boat which was sent to Graveyard to obtain samples, reported lots of fish from the mouth of Naknek River to Graveyard, but nothing had shown up in the Kvichak River test nets.

Egegik, meanwhile, had also started to improve dramatically. There were 106,000 enumerated by aerial survey in the lagoon and close to 300,000 estimated in the river below. Twelve hour openings were announced for July 3 for Egegik, Ugashik, and a reduced Naknek Section for drift boats while the normal Naknek Section would be open for set net fishermen. Stock separation samples had been gathered from the Naknek escapement and from the district test goat at Graveyard for Kvichak scales. Although not pure Kvichak fish, the scales gathered at Graveyard would suffice as Kvichak samples until adequate scales could be gathered at Kvichak tower. It was estimated that the Naknek escapement would probably reach 800,000 before the effects of the commercial fishery would be felt.

More than 461,000 sockeye had passed Naknek tower by 6:00 a.m., July 3 with an hourly rate of over 10,000. By the time the fishery opened at 10:00 a.m., over 549,000 had passed and the hourly rate had risen to over 19,000. An aerial survey of the fishery showed mixed fishing success. Some boats off the mouth of the Naknek and on the beach at Johnson Hill were doing well, but the majority in the remainder of the reduced section were having a hard time finding fish. The Kvichak River escapement, meanwhile, had finally begun with large river test fishing indices on the afternoon tide. The west bank indices were over 2,000 and the east side indices were over 10,000. A cursory survey of the Kvichak River showed a strong abundance of fish from Ron Hayes' lodge downstream. Scale samples for stock separation analysis were taken from set net catches south and north of the Naknek River and drift samples would be taken on the evening high tide. Because of the large Naknek escapement, fishing time in the reduced section was extended until 6:00 p.m., July 4.

Catches continued to be moderate in the Naknek Section on July 4 (Table 13). The Naknek escapement through 10:00 a.m. had reached 825,000 with an hourly rate of just over 4,000. An aerial survey of the Kvichak River produced an estimate of about 200,000 with fish just beginning to pass the counting tower (Table 28). Egegik and Ugashik fisheries were both strong on July 3 (Tables 14 and 15). The Naknek Section fishery was again extended until 6:00 p.m., July 5.

An aerial survey of the Kvichak River the morning of July 5 produced an estimate of 250-300,000 in the river with 124,000 enumerated past the tower. Commercial catches were estimated at 225,000 on July 3, 215,000 on July 4, and 210,000 on July 5, with age composition of the commercial catch still showing a run dominated by the 3-ocean age classes. Stock identification analyses were not completed at this time, therefore a 26 hour extension until 8:00 p.m., July 6 was announced. Kvichak River test fishing indices dropped to low numbers on

the afternoon tide. The Kvichak escapement was running about seven days later than the long-term average while the Naknek escapement was five days ahead of the long-term average. The Naknek River personal use fishery was opened the evening of July 5.

Stock separation data became available on July 6 from catches on July 3 and July 4. Based on 5(3) and 5(2) scale analysis, Kvichak stock interception by the drift fleet was estimated at 40%, with a classification accuracy of 77%. The data also indicated that beach catch interception of Kvichak fish north of Pederson Point was 30%; from Pederson Point to the new Naknek Section marker was 25%; from the new marker to north Naknek point was 9%; and the South Naknek beach was zero. By noon, July 6, the Naknek escapement rate had dropped to less than 900 per hour. The fishery was allowed to close in order to bolster Kvichak escapement. It is normal for the latter part of the run to be dominated by Kvichak fish.

Two district test boats were sent out on July 7. One fished the Low Point area and on the west side between Deadman Sands and Etolin Point. Results were discouraging when only low to moderate catches were made. The second boat fished the Kvichak section resulting in indices from zero to 864, and no real indications of run strength were found anywhere. The commercial catch was at 994,000 through July 6. Escapements totaled 928,000 past Naknek tower and less than 300,000 in the Kvichak. A scale analysis sample taken from Naknek Section commercial drift catches on July 5 showed an interception rate of 6%, and there were reports of fish off the South Naknek beach, off the north Naknek beach, and up to Graveyard.

Naknek tower counts began increasing steadily on July 8 with the total escapement reaching over one million by the 6:00 p.m. count. The Kvichak escapement, meanwhile, was estimated at 221,000 past the tower and less than 50,000 in the river based on an aerial survey the afternoon of July 8. River test fishing

indices increased to 4,000 on the west bank and 2,000 on the east bank. Continuous reports were received of jumpers everywhere. In response to these developments a 12 hour fishing period on July 9 was announced for set net fishermen in the Naknek Section and a six hour fishing period for drift fishermen in the Naknek River Special Harvest Area. Notice was given that portions or all of the Naknek Section beaches may be closed and would depend on scale analysis results.

An aerial survey on July 9 of the Kvichak River gave an estimate of 250-300,000 in the river and 232,000 past the counting tower. The Naknek escapement through 2:00 p.m., July 9 had reached nearly 1.3 million. An aerial survey of the Naknek River Special Harvest Area opening revealed about 200 (plus) boats and 78 set nets participating. Although gear was limited to 50 fathoms per vessel, fishing activity at the lower line at Bumble Bee Seafoods resembled that of the Johnson Hill and north Egegik lines with boats jockeying for position and running over one another's nets. By most standards, it was still more orderly than expected given the constriction inside the river banks. The catch exceeded 132,000 in the river and 71,000 on the section beaches. Scale samples were taken on the beaches for stock identification analysis on July 9 which indicated that the fish caught in set nets from Pederson Point to Libbyville were about 18% Kvichak origin. Fishing on the beaches was extended for an additional 12 hours until 1:00 p.m., July 10 except for those set nets north of Pederson Point dock. At the same time, an announcement was made to open the Naknek River Special Harvest Area for another six hour period beginning at 5:00 a.m., July 10.

Escapements through 6:00 a.m., July 10 were just under 1.5 million past Naknek tower and 293,000 past Kvichak tower with an additional 100,000 estimated in the river. Kvichak River test fishing indices had been climbing during the

past three tides. Set nets south of Pederson Point were extended an additional 12 hours until 1:00 a.m., July 11 while the "in river" fishery was extended an additional 35 hours until 10:00 a.m., July 11. Because no new scale analysis data was available, the beaches south of Pederson Point were extended an additional 24 hours until 1:00 a.m., July 12.

Heavy westerly winds blew most of July 11, as Kvichak River test fishing indices increased steadily. An aerial survey of Kvichak River the afternoon of July 11 produced an estimate of 200,000. This, coupled with a tower escapement count of 455,000 yielded a total escapement estimate of 655,000, while the Naknek escapement was over 1.7 million. Many boats in the river fishery were averaging 900-1,000 fish with some as high as 1,500-1,600. The commercial catch in the river was 307,000 on July 10 with an additional 83,000 in the section set net catch. Many set net fishermen from north of Pederson Point and from the west side of the Kvichak District came in to question the Department's decisions. Because scale analysis information was still not available on beach catches by 6:00 p.m., July 11, the beach fisheries south of Pederson Point were extended until 2:00 a.m., July 13. In addition, the river fishery was extended through the weekend subsistence fishery until 8:00 a.m., July 15, which was justified by the exceptionally strong Naknek River escapement.

River test fishing indices dropped slightly on the early tides of July 12. The commercial catch on July 11 was 315,000 in the river fishery and 116,000 in the section beach fishery. Scale analysis results indicated a 30% interception of Kvichak fish for both the north Naknek and South Naknek beaches. Due to the low Kvichak escapement and the high interception rate in the beach catches, the section beach fishery was allowed to close as scheduled at 2:00 a.m., July 13. The Naknek River fishery was allowed to continue since the escapement through

6:00 p.m. on July 12 was over 1.8 million. The Kvichak escapement totaled 601,000 past the tower and another 400,000 estimated in the river from an aerial survey that afternoon.

Many set net fishermen were asking why they were closed when they were taking so few fish, while others were questioning openings in the Egegik and Ugashik Districts and the amount of Kvichak interception there. An aerial survey of the Kvichak River on July 13 was disappointing, with my estimates of at least 150,000 to 280,000. The escapement past the tower through 6:00 p.m. was 750,000. The commercial catch in the river for July 12 was 131,000 while the beach harvest was 76,000.

River test fishing indices continued to drop on July 14. Tower counts on the Naknek River were averaging less than 600 per hour with a cumulative total through 6:00 p.m., July 14 pushing 1.9 million. The Kvichak tower count through the same time period was 906,000 with an hourly rate of 5,700 but beginning to drop.

River test fishing indices dropped dramatically on July 15. Kvichak tower counts dropped to less than 30,000 on July 15. Due to the extreme budget shortfall, the river test fish program was terminated after the July 15 drifts as was the Naknek tower. The preliminary escapement estimate was just under 1.9 million. Due to the large Naknek escapement, the small Kvichak escapement, and westerly winds in the forecast, the river fishery was extended until 9:00 a.m., July 19, while the beaches remained closed to fishing. It was announced that normal five day per week fishing would resume in the Naknek Section beginning the morning of July 21 while the Kvichak Section would remain closed until July 28. The Kvichak tower program was terminated at the end of July 18 with a daily count of only 5,000 and a cumulative of just over 1.0 million. With very few sockeye escaping into the Kvichak and the strong possibility of large numbers of chum and pink

salmon present in the district, a decision was made to allow the entire district to open at 9:00 a.m., July 21. Catches for the remainder of the season totaled 108,000 sockeye, 176,000 chum, and 86,000 pink.

The final Naknek escapement estimate of just under 2.0 million was extrapolated from average daily escapements from July 10-15, from catches in the Special Harvest Area from July 9-19, and the ratio of escapement to harvest when the river fishery was open. The final Kvichak escapement of just under 1.2 million was interpolated using additional intermittent counts made by the crew-leader on July 22-24, information from an aerial survey of the river on July 21, and long-term average percentage of escapement by day.

The preliminary sockeye catch of 2.9 million was 41% of the 20 year average and only 29% of the recent 10 year average, the lowest catch since 1977. The total Kvichak run of 2.0 million was the lowest run since 1973 and was only 44% of the preseason forecast while the Naknek River run of 3.9 million was 23% above forecast. The Branch River run totaled 398,000 including a catch of 168,000 and an escapement of 230,000.

Over 1.0 million salmon were harvested in the Naknek River Special Harvest Area (as shown below) and was worth ore than \$9.0 million to the commercial fishermen.

NAKNEK RIVER SPECIAL HARVEST AREA
PRELIMINARY CATCH

<u>Date</u>	<u>Sockeye</u>	<u>Kings</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
July 9	132,722	13		29	132,764
July 10	306,578	37	9	54	306,678
July 11	315,398	44		115	315,557
July 12	130,507	46		113	130,666
July 13	91,775	38		53	91,866
July 14	52,796	19		25	52,840
July 15	17,847	8		6	17,861
July 16	16,535	14	3	21	16,573
July 17	50,327	37	1	28	50,393
July 18	32,953	29	40	226	33,248
July 19	14,735	6	3	47	14,791
Totals	1,162,173	291	56	717	1,163,237

Without this inriver fishery, most of these fish probably would have gone into the Naknek escapement during the extended closures used to protect the weak Kvichak run. Nearly 300 drift fishermen and 160 set net fishermen participated in the Special Harvest Area fishery.

Other salmon species catches usually total less than 5% of the total district salmon catch (Table 13). The catch of king salmon was 3,600, slightly under the most recent 10 year average (Appendix Table 10). Escapements of kings were deemed adequate in the Naknek system with a total aerial survey estimate of 7,800 (Table 27). The sport fishing effort and catch were also higher than average, and the in-river fishery harvest was known to have some effect. The Branch River king escapement was estimated at 7,200 (Table 27).

The chum salmon catch of 208,000 was also below the recent 10 year average of 273,000 (Appendix Table 11). Although pink salmon return only in even years to Bristol Bay, the catch of 86,000 was far below the long-term even year average of 258,000 (Appendix Table 12). Escapements of pink salmon were estimated at 286,000 in the Naknek River and 146,000 in the Branch River (Table 27). No survey of the Kvichak River was made in 1986. The coho catch was 3,100, slightly under the recent 10 year average of 4,800 (Appendix Table 13). No aerial survey escapement estimates were made for coho in the Naknek-Kvichak District.

The preliminary subsistence catch from 409 permittees totaled 82,000 salmon of which 78,000 were sockeye (Table 42). There were few reports of individuals getting inadequate numbers of fish, although some permittees from the Iliamna area had to wait until later in the season than normal to meet their requirements.

The personal use fishery on the Naknek River opened on July 5 and a total of 30 permits were issued. The average catch per permittee (23 returned) was 49 salmon (Table 42).

Egegik District

The 1986 sockeye salmon run to the Egegik District totaled 6.2 million fish, exceeding the preseason forecast of 5.4 million by 15% (Table 1). This was the fourth largest run on record and it produced the fourth largest sockeye harvest (5.0 million fish) in district history. An escapement of 1.2 million fish was achieved, exceeding the point goal of 1.0 million but still within the desired range of 0.8 to 1.2 million. Total runs during comparable cycle years dating back to 1956 have ranged from 1.8 to 5.1 million sockeye with a mean of 2.9 million, making the 1986 run the largest on record for this cycle year (over twice the long-term cycle year average).

The preseason run prediction for the district totaled 5.4 million sockeye (Table 2). The projected 4.4 million harvest (33% of the Baywide harvest forecast) generated substantial interest in the district from both fishing and processing sectors. District registration records (Table 12) indicated 522 drift permit holders registered to fish the Egegik District at the beginning of the Emergency Order period (June 23). Concern for achieving escapement goals and minimizing potential interception of fish bound for the Kvichak River despite the massive fleet size was a major management consideration going into the season. Obtaining an adequate king salmon escapement into the Egegik drainage was a second major early-season management concern.

Due to a small escapement of king salmon in 1985 and a trend toward decreasing escapements to drainage index streams since 1982, an Emergency Order was issued (effective June 3) shortening the weekly fishing period from five days to four days per week prior to June 23. It was hoped that providing three days per week rather than two for escapement would sufficiently reverse the downward trend, and make the use of more severe restrictions unnecessary.

Initial sockeye harvests were recorded in the district June 9. An aerial survey of the fishery June 10 yielded a count of 11 drift boats and 42 setnets engaged in fishing (Table 14). Small catches of sockeye and kings were made during 9-13 June, but catches increased the following week as effort levels increased (222 drift boats and 130 setnets June 18). Through 20 June a total of 97,000 sockeye and slightly over 1,000 kings had been harvested. By using historical cumulative catch percentage averages through June 20, (2% for sockeye and 32% for kings) it was possible to make projections of the total season's harvests using 1986 data. These projections totaled 4.7 million for sockeye and approximately 3,000 for kings. This projected sockeye harvest compared favorably with the preseason estimate of available catch at 4.4 million, while the king catch projection indicated an average harvest was occurring (20 year average catch = 3,000). Considering these early season inshore indicators, the pre-Emergency Order phase of the fishery offered no serious cause for concern with regard to strength of both the sockeye and king runs, although offshore indicators were less supportive. Because the False Pass intercept fishery had been consistently poor for sockeye throughout the June 11-21 period and the Department's Port Moller test fishing program was not operating due to budget constraints, there were questions regarding run timing and overall run strength. Were the fish late at False Pass, causing fishermen there to simply miss them, or was the actual run size significantly less than forecast? A new policy requiring closure of the False Pass fishery when a quota of 400,000 chums had been taken also led to concern that fishing in that area was being conducted in a manner different than in past years (to avoid chums) making comparison of harvest rates between years questionable.

At 9:00 a.m., June 23, the district went under Emergency Order management. Escapement to that point was zero at Egegik tower and the Egegik River inside

test fishery indicated approximately 27,000 sockeye had passed the test fish site just upstream of Wolverine Creek (350 index points X 19-year average of 78.6 fish per index point). With only a minimal number of fish in the river the fishery remained closed June 23.

Analysis of age data obtained from district catch samples collected June 19-20 indicated a higher proportion of 3-ocean and lower proportion of 2-ocean groups in the catch than was forecast. Because 53% of the predicted run was expected to be the 2-ocean age group 5(3), this finding gave reason for concern.

The fishery remained closed June 24 awaiting additional escapement. The first fish of the season arrived at the counting tower that day but not in substantial numbers. Inside test fish data June 23-24 (Table 29) indicated increased higher escapement rates over those previously observed with estimates of total entry ranging from 37,000 (based on fish size) to 70,000 (based on historic escapement per index (EPI) values). With the large fleet capable of harvesting every available fish on the next commercial opening, an escapement of approximately 100,000 (10% of the point goal) was considered desirable prior to authorization of a fishing period.

Escapement rates continued to build June 25-26 and by 3:00 p.m., June 26, projections based on inside test fish data indicated 71,000-140,000 fish had passed through the fishing district into Egegik River. This was the basis for an announcement opening the fishery for 11 hours beginning at 4:00 p.m., June 27.

The June 27-28 opening produced a catch of 182,000 sockeye, 7,000 chums, and two hundred kings. Effort totaled 500 drift boats and 227 setnets. Aerial survey observations indicated most of the catch was taken in the outer district rather than inside Egegik Bay proper. This catch brought the accumulative harvest to 279,000 sockeye, 14,000 chums, and still only little more than 1,000 kings. Comparison of these totals with the long-term (1965-83) average catch percentages

of 17%, 72%, and 17% for sockeye, kings, and chums respectively, through June 28, indicated the sockeye run was either much weaker than expected or later than usual. Chum projections indicated a catch nearly twice the long-term average, while the king catch was falling short of the historic average. Although it was too late at this point to provide much protection for kings, caution was necessary with regard to future sockeye openings based on the above projections and in light of the dismal catch success in the False Pass fishery.

The June 27-28 fishing period was not extended due to marginal fish abundance in the district, especially the inner waters. Escapement past Egegik tower through June 27 totaled 17,000 sockeye, right at the 31-year mean for that date. Passage at the inside test fish site during the June 26-28 period was minimal (Table 29) indicating escapement counts at the tower would probably remain low over the ensuing couple of days.

An outside test fish boat (the F/V Anna Paul) was dispatched to sample fish abundance at several locations within and adjacent to the district June 29. Results of this sampling indicated low levels of sockeye abundance throughout the district with no major concentrations observed (Table 7). This information, coupled with continued low inside test fish indices and tower counts, supported keeping the fishery closed June 29-30.

On the evening of June 30 a spotter pilot reported a significant increase in fish abundance just outside the entrance to Egegik Bay (Red Bluff to Coffee Point) in such densities that individuals were able to dipnet them for dinner. This observation was further confirmed later in the evening by Brian Bue, an ADF&G observer who was at the Columbia Wards Fisheries dock preparing to embark on another outside test fishing trip July 1. He reported "jumpers" all over the inside waters of the bay from Coffee Point upstream to King Salmon Island.

Escapement past the tower through midnight June 30 totaled 43,000 sockeye, slightly below the 31-year mean. Accumulative inside test fish data indicated an escapement ranging from 142,000 fish (based on average fish length of 543 mm yielding 41 fish per index point) to 272,000 fish (using historic average of 78.6 fish/index point) had entered the river through June 30. Outside test fishing results on July 1 were much improved over those from June 29 (Table 7). Lots of fish were located from the north Egegik boundary all the way to Middle Bluff. In addition, aerial survey observations at Coffee Point at 2:00 p.m., July 1, documented a continued showing of jumpers in that vicinity. Based on these observations which indicated fish movement into Egegik River, Egegik Bay, and waters immediately adjacent to the district, a 12-hour fishing period was announced to commence at 7:00 a.m., July 2.

An aerial survey of the fishery at 2:00 p.m., July 2 confirmed 551 drift boats and 231 setnets fishing, and 68 tender/processors awaiting the catch. Good catch success was noted throughout the district and by both gear types. An estimated 300,000 fish were observed in Egegik River and another 106,000 were noted in Egegik Lagoon. Because of the apparent large volume of fish available both in the district and entering the escapement, another 12-hour fishing period was announced beginning at 8:00 a.m., July 3. This period, like the preceding two, opened on a hold-over low tide so that setnets would have fishable water at the onset of the opening, as specified by the results of a survey conducted by the Egegik Setnet Association this past winter.

The July 2 catch totaled 829,000 sockeye and 12,000 chums (peak daily catches for both species) bringing the cumulative catch to 1.1 million sockeye and 26,000 chums. Escapement past Egegik tower through midnight July 2 totaled 94,000 sockeye, 9% of the point goal, and a survey of Egegik Lagoon at noon July 3 yielded

an estimate of 133,000 just downstream of the tower site. Fishing success again appeared very good on July 3, especially from setnets and inner district drift nets. Total effort peaked July 3 with 560 drift boats and 229 setnets fishing. After two very successful fishing periods, the fishery was allowed to close as scheduled at 8:00 a.m., July 3 for catch evaluation, scale sample analysis, and escapement.

Escapement past the counting tower through midnight July 3 totaled 211,000 fish, 21% of the point goal and well ahead of the 31-year mean accumulative passage of 126,000 for this date. Inside test fish results July 4 rebounded to levels above those of July 3 (Table 29). Preliminary data from scale sample analysis of the commercial catch taken July 2 indicated less than 2% interception of fish bound for districts farther north. An outside test fish boat dispatched July 4 to sample fish abundance in the district found large concentrations of fish in the vicinity of Red Bluff, on the North Flats, and two miles north of the district (Table 7). Based on the indications that escapement rates were adequate, additional fish were available in and adjacent to the district, and that significant interception was not occurring, a 12-hour fishing period was announced to begin at 9:00 a.m., July 5.

An aerial survey of the district at noon July 5 indicated 449 drift boats and 227 set nets fishing. Catch success appeared good, especially in inner district waters from Coffee Point to the upper marker. Additionally, an aerial survey of Egegik River and lagoon indicated lots of fish movement into the river past the fishery (estimated 200,000 in the river and 89,000 in the lagoon). It appeared as though the fishery had caught remnants of a large surge of fish moving into the river. With this in mind, the fishery was allowed to close on schedule.

As of 7:00 p.m., July 5, actual escapement was estimated at roughly 660,000 fish (370,000 past the tower, another 90,000 estimated in the lagoon, and an estimated 200,000 downriver). With inside test fish indices remaining high July 5 (Table 29) conditions were favorable for additional fishing time, so a 12-hour opening was scheduled for July 7. The sockeye catch through July 5 totaled 2.2 million fish, 50% of the preseason harvest forecast. Harvest projections based on the 19-year mean cumulative catch percentage (59% through July 5) yielded a total projected catch of 3.7 million sockeye. The chum catch totaled 38,000 fish and when projected forward (based on the historic mean of 44% of catch by July 5) yielded a total season harvest of 86,000 fish, well above the long-term average. The king catch remained under 2,000 fish.

Fog prevented an accurate count of boats and assessment of drift success on the morning of July 7. Setnet success appeared moderate in inside waters and only fair on the outside. A southeast wind at approximately 20-25 knots made river surveying difficult, but an estimated 46,000 fish were observed in Egegik Lagoon. Reports from spotter pilots and individual fishermen indicated the district was somewhat "flat" compared to recent openings and that the chum proportion was increasing. The fishery was allowed to close on schedule at noon, July 7 to provide additional escapement.

Escapement past the tower through 2:00 p.m., July 8 totaled 663,000 fish. Inside test fish results indicated an increase in passage rates after two straight days of falling indices. With the lower end of the escapement goal (800,000 fish) reasonably near, and more fish entering the river, another fishing period was announced for July 9.

Inside test fish indices continued to increase July 9 and the test fish crew reported seeing lots of fish breaking the water surface near the test fish site. Catch success in the district appeared good, especially from entrance channel

drifters and inner district setnets. Weather was calm and a survey of the river yielded a count of 21,000 fish in the lagoon and numerous "finners" in muddy upriver areas just below the lagoon. Based on the historic mean EPI value of 78.6 and 10,276 inside test fish index points accumulated thus far, roughly 808,000 fish were estimated to have entered the river. At this point, 670,000 had actually been counted past the tower, leaving an estimated 138,000 fish in the river above the test fish site. Despite projections which indicated the lower range of the escapement goal was at hand, the fishery was again allowed to close on schedule to provide another "window" for escapement and minimize potential interception along outer district lines.

The catch through July 9 totaled 3.1 million sockeye, 70% of the harvest forecast. Escapement past the tower totaled 697,000 fish, 70% of the point goal. With inside test fish indices continuing to increase (Table 29) additional fishing was permissible so a 12-hour period was announced for July 11.

A total of 351 drift boats and 208 setnets were fished July 11 (Table 14). Catch success was reported "spotty" from outer district waters but appeared good from inner district setnets. The fishery closed on schedule at 2:00 p.m. to build fish abundance throughout the district and allow another "window" for passage of fish potentially bound for other districts.

Catch through July 11 totaled 3.6 million sockeye and 52,000 chum. Escapement totaled 773,000 fish past the counting tower with another 160,000 estimated in the river. Inside test fish data (Table 29) continued to show moderate daily increase in sockeye escapement into the lower river. With escapement building at an acceptable rate, the plan was to keep the district closed July 12 and then open again July 13. However, it was necessary to survey Ugashik River July 12 and while enroute, the entire shoreline was flown from the Naknek River mouth to Ugashik Bay. During the survey "jumpers" were observed at several locations

indicating the presence of sockeye schools. Several were noted between Low Point and Middle Bluff, 18 were seen on one pass by Cape Chichagof, and three were observed in the North Flats area of the Egegik district. A large number were seen (4-8 in the air at a time) in much of the entrance channel to Egegik Bay (Bishop Creek to Coffee Point) near shore. It was apparent that a large volume of fish were about to pass through Egegik Bay and into the river. On the return flight from Ugashik, the Egegik Lagoon was also surveyed yielding an estimate of 63,000 fish. The tower count through 2:00 p.m., July 12 totaled 800,000 fish. Adding to these the 63,000 fish in the lagoon, and another 100,000 estimated downriver, roughly 960,000 fish were estimated to have escaped the fishery and the mass of fish at the entrance to the Bay were surplus to escapement requirements. Thus, a short notice Emergency Order was issued opening the Egegik District to fishing for 24 hours beginning at 4:00 p.m., July 12.

The short notice opening caused some confusion and a lot of hectic activity for the fleet, but overall proved very successful as over 720,000 fish were caught during the July 12-13 period. A 24-hour extension was added effective at 4:00 p.m., July 13 and the fishery remained open thereafter for the duration of the Emergency Order period. Escapement totals continued to increase as projected reaching 980,000 fish by noon, July 15. A Commissioner's Announcement was then issued waiving the transfer waiting period for entry into the district and continuous fishing was announced.

Escapement counts were terminated earlier than normal (midnight July 15) as part of the Department's response to new budget restrictions. The final actual count from the counting station through midnight, July 15 was 981,846 sockeye. A cumulative proportion was used to estimate the number of fish missed due to the early termination of counting. Historically 85.28% of the escapement has been obtained through July 15 (based on 31 years of data collected at Egegik

tower, 1955-85). Extrapolation of this season's total based on the above percentage yielded a final season estimate of 1,151,320 fish. Escapement was obtained from each major segment of the run (Table 25). A sex ratio of 51% males to 49% females was observed in the escapement.

The July 13 catch was the last really large one of the season. Landings tailed off quite rapidly thereafter (Table 14) with daily catches dropping below 50,000 fish by July 18. Most of the drift fishermen left the fishery by July 20 with a few remaining to fish cohos. Sockeye landings continued through the end of August with small numbers being taken incidentally during the coho fishery. The final district sockeye catch slightly exceeded 5.0 million fish.

Age composition analysis of the sockeye run (Table 3) indicated that the 5(3) Age Group was dominant in both the catch (47%) and escapement (49%). Age Groups 6(3), 4(2), and 5(2) followed in that order in the escapement. Age Group 5(2) was the second leading component (21%) of the catch followed by Age Groups 6(3), and 4(2), respectively. The difference in percentages of Age Group 5(2) in the catch (21%) and escapement (7%) was the only indicator by season's end that some fish in the catch may have been destined for other districts. Scale samples were specifically collected for scale pattern analysis and stock separation purposes using the outside test fish boat on each of its trips. Results of that analysis are not yet available.

A total of 31 buyers operated in the district this season (Table 37), a decrease of 16 compared to 1985. Due to the staggered nature of the openings and the capacity of these buyers there were no reported instances of catch exceeding processing capability. In keeping with the recent trend, most of the catch was taken aboard floating freezer processors or tendered to other districts for processing. No canning lines were operated in the district this season.

Fishermen harvested 81% of the sockeye run, the fifth highest exploitation on record and the fifth season since 1980 that the harvest has exceeded 80%. The 36 year (1951-86) mean exploitation has been 69%.

The commercial harvest of all other salmon species in the district totaled 133,000 fish, 3% of the total district harvest (Table 24). The king salmon harvest of nearly 2,000 fish was the lowest in the last 10 years and well below the 20-year (1967-86) average of 3,000. The most recent 10-year king catch has averaged nearly 4,400 fish. The chum catch of 94,000 fish was the fourth largest on record, well above the 1967-86 mean harvest of 58,000. The small catch of pink salmon (3,000 fish) was similar to the recent 20-year average harvest for this species. The coho catch totaled 35,000 fish, twice the 20-year average harvest and a little above the recent 10-year mean of 31,000. Fishing periods were reduced both in June (pre-June 23) and in August (after August 12) to four days per week to protect runs of kings and cohos that appeared weaker than those of recent years.

Aerial surveys of index streams in the district during August revealed that escapements of both king and chum salmon were weaker than desired (Table 27). The number of kings observed totaled only slightly over 500 while approximately 6,000 chums were counted. Coverage and viewing conditions were good. These observations further confirmed the trend toward decreasing escapements of kings in this district since 1982. This was also the second consecutive year that chum salmon escapement indices have failed to reach 10,000 fish. Cohos were counted in Egegik River once (August 9) and an estimated 12,500 were observed.

In retrospect, the sockeye season was very successful. High prices paid by the buyers, periodic short fishing periods, and the practice of opening periods when all gear types had enough water to fish immediately led to a much more successful season for the setnet sector. Drift gillnet fishermen also fared well

in the district although their numbers remained at very high levels. Enforcement efforts were largely successful in confining fishing within open waters. It is apparent however, that additional management effort will be necessary to reverse declining escapements of king and possibly chum salmon. In spite of long closed periods (only 12 hours were fished between June 20 and July 2) and a reduction in fishing prior to June 23 from five days to four days per week, king salmon escapement was minimal. More extensive curtailment of early fishing may be necessary for the next couple of years to ensure that brood strength reaches acceptable levels (at least 2,000 spawners).

Escapement monitoring during the coho fishery remains a problem. Without a systematic program to enumerate coho escapement, it is difficult to justify issuance of Emergency Orders designed to ensure escapement. While not the ultimate solution, additional aerial survey funding would be helpful.

Ugashik District

The 1986 sockeye run to the Ugashik District totaled 5.9 million fish, the second largest run on record exceeded only by the 1985 run of 7.4 million fish. It exceeded the preseason forecast of 4.9 million by 20% (Table 1), and yielded a 4.9 million harvest, the second largest harvest in the history of the fishery. An escapement of 1.0 million fish was attained exceeding the escapement goal of 700,000 and marking the eighth consecutive year that a million or more sockeye have reached the spawning grounds. Compared to similar cycle years dating back to 1951, the 1986 run was the largest on record exceeding the cycle year average of 1.2 million sockeye by nearly a factor of five.

The preseason outlook for the district was optimistic with a 4.2 million fish projected harvest. However, a low forecast for the Naknek-Kvichak District

led to speculation that fishing effort might be shifted out of the Naknek-Kvichak and into the Egegik and Ugashik Districts increasing competition in these areas and presenting additional management complications. By early June daily district registration totals in excess of 100 drift gill net units made it apparent that increased effort was being directed at the Ugashik District (Table 12).

Initial salmon landings occurred May 30 with a small king catch reported (Table 15). The first sockeye of the season were landed June 7. Catches of both species remained small through June 15. By June 16 approximately 100 drift gill net boats were actively fishing the district, four to five times the normal early season effort. Despite the increased effort, catches during the week of June 16-21 remained small (Table 15). Going into the "Emergency Order" period June 23 the cumulative sockeye catch totaled 91,000 fish while the king and chum catches totaled 2,700 and 2,300, respectively. Compared to previous catches prior to the Emergency Order period for the years 1965-85, this sockeye catch was well above the previous high (51,000 in 1985), was also above average, but the king catch was lagging despite the increased effort levels.

As of 9:00 a.m., June 23, inside test fishing upstream of Ugashik village indicated less than 1,000 sockeye had passed the test fish site. With few fish indicated in the river and considering the need to minimize potential interception of sockeye bound for the Kvichak District, the fishery was kept closed at the June 23 onset of the Emergency Order period. Fishermen and processors were advised that substantial movement of fish into the inner Ugashik Bay and lower sections of Ugashik River was necessary before fishing would be permitted.

No substantial movement of fish into the inner waters of Ugashik Bay was evident during the period June 23-July 1 so the fishery remained closed. For the first time in the past seven years an "outside" test fishing program was

employed to monitor fish abundance at selected stations in the district and test boats were dispatched three times during the above closure. Data from these outside test boats on June 26, June 29, and July 1 showed daily increases in sockeye abundance throughout the district (Table 8). It was also noted that some of the fish were "watermarked" indicating they were probably Ugashik fish just milling around in outer district waters.

Due to budget considerations the counting towers at the outlet of Lower Ugashik Lake were not installed until July 1 this year. Inside test fish data (Table 30) indicated that very few fish were available to count prior to that date so it was believed that the later start did not introduce any significant error in escapement estimates.

Reports of lots of fish jumping in inner Ugashik Bay waters began arriving during the morning of July 2. Fish were reported at the mouth of Dago Creek, at the Pilot Point dock, and along the cutbank upriver of Pilot Point. Fog prevented an aerial survey to confirm these reports but because several independent sources all agreed on this information, and recent outside test fish data indicated a build-up of fish in the district, it was concluded that the desired movement of Ugashik fish into the river was beginning. Because Ugashik fish have been known to surge into the lower Ugashik River in large numbers over short time spans, a commercial opening of 12 hours was announced effective at 8:00 a.m., July 3.

An aerial survey of the fishery on the morning of July 3 confirmed the presence of large numbers of fish in inside waters. Set nets all along the Pilot Point beach were full of fish. Drift nets throughout inner and outer district waters were catching lots of fish. A total of 316 drift nets and 94 set nets were observed fishing and 51 receiver vessels were awaiting the catch. Jumpers were observed in closed waters between the upper fishing boundary and Ugashik village indicating some fish had made it past the fishery and were moving on

upstream. The fishery was allowed to close on schedule at 8:00 p.m., July 3, to permit catch evaluation, allow fish abundance to build back up in the district, and minimize any potential interception effects on other districts.

The July 3 catch totaled 765,000 sockeye (Table 15) bringing the cumulative sockeye catch to 856,000 fish, 20% of the preseason harvest forecast. Over the 19 year period 1965-83 the cumulative percentage of the season's catch through July 3 has averaged 16%. Projecting ahead based on the 16% figure, indicated a total season catch of approximately 5.3 million fish.

The fishery remained closed July 4 pending an assessment of the volume of escapement into the lower river. No fish had yet arrived at the counting towers and movement past the inside test fishing site through July 3 was minimal (Table 30). Inside test fishing indices began to increase rapidly on the evening of July 4 indicating the pulse of fish that entered the river July 2-3 was moving upstream. A reconnaissance of Ugashik River between the mouth of King Salmon River and Ugashik village by the inside test fishing crew provided information that large numbers of fish were present in the lower river. Based on these indicators another 12 hour fishing period was announced effective at 9:00 a.m., July 5.

Aerial observations of the fishery during the afternoon of July 5 indicated good catches were being made by most fishermen. Drift net success appeared good both inside and outside Ugashik Bay while set net success was fair on outside beaches, poor along Pilot Point beach, and good upstream along "Cutbank" beach areas. Ugashik village set nets were full of fish. Overall effort was similar to the July 3 level. Again the fishery closed on schedule to permit catch analysis and allow another "window" for passage of any fish bound for other districts.

Inside test fishing data from July 5 showed a continued increase in the rate of fish passage up Ugashik River (Table 30). The first fish of the season were

observed on July 5 in Ugashik Lagoon, roughly one mile downstream from the counting towers.

The July 5 catch totaled 562,000 sockeye bringing the cumulative catch to a little over 1.4 million fish, one third of the preseason forecast. It was apparent the run was arriving either ahead of schedule or in stronger than expected volume. Both catch and inside test fishing data indicated run timing to be earlier than normal.

The fishery remained closed July 6 as inside test fishing indices continued to climb. District registrations for drift fishermen increased dramatically July 6 to approximately 506 (Table 12) as recent catch success attracted fishermen away from other areas. No sockeye had yet arrived at the counting towers but indications of lots of fish downstream provided the basis for continued commercial openings. As of 8:00 p.m., July 6, an estimated 131-273,000 fish were projected to have passed the inside test fishing site (depending on whether one used the historical fish per index average or a current estimate based on fish size). Based on inside test fishing data, and the exceptional strength of the early portion of the run, another 14 hour fishing period was announced effective at 10:00 p.m., July 6.

Fog prevented an accurate count of drift effort on the morning of July 7. Spotter pilots collectively estimated catch success at 1,000 fish per boat while set net success was only fair. Lots of jumpers were noted between the mouth of Dog Salmon River and Ugashik village indicating more fish movement into the lower river during the last closure. Inside test fishing results continued to increase, and despite murky waters a large school of sockeye was observed "finning" at the outlet of Ugashik Lagoon. Collectively these factors indicated escapement was occurring but because visual confirmation of actual magnitude still was not possible, the fishery closed on schedule at noon, July 7.

The July 6-7 catch totaled 551,000 sockeye bringing the cumulative catch to nearly 2 million. Scale samples from catches through July 5 indicated lower than anticipated percentages of 2-ocean and higher percentages of 3-ocean age groups in both commercial and inside test fishing catches from the district. Because the catch and inside test samples seemed to be reasonably matched, interception was estimated to be minimal.

The first fish passed Ugashik tower during the evening of July 7. An aerial survey of Ugashik Lagoon at noon, July 8, yielded an estimate of 18,000 fish holding in the lagoon (Table 30). Aerial observations of jumpers from six miles north of Cape Grieg all the way into Ugashik Bay and up the lower river to Ugashik village on the morning of July 8 provided evidence of another surge in the run. With at least half the escapement goal estimated in the river at this point, another 14 hour commercial opening was announced effective at 11:00 p.m., July 8.

An aerial survey on the morning of July 9 confirmed the presence of a large volume of fish in the district. Drift nets throughout the district were making good catches and set nets were also doing quite well, especially those along the "cutbank" and at Ugashik village. The drift fleet had grown to 643 boats, a new record for the district. In spite of the effort numerous fish were seen jumping within the district and in waters just to the north. Additional jumpers were noted in lower areas of Ugashik River and 86,000 fish were observed in Ugashik Lagoon. Due to the record effort and the need to evaluate its impact, the fishery closed on schedule at 1:00 p.m., July 9.

The July 8-9 catch totaled 714,000 sockeye, bringing the cumulative catch to 2.7 million fish. Escapement past the counting towers totaled less than 1,000 fish but estimates of the number of fish in the river past the test fishing site ranged from 360-583,000 based on inside test fishing indices

(17,158) multiplied by 21 (based on a fish length relationship) or by 34 (the 16 year mean fish per index point). With additional fish known to be present below the test fishing site, prospects for attaining the escapement goal were considered very good. Only a large "backout" of fish could threaten escapement progress.

The fishery remained closed July 10 allowing another opportunity for any fish bound for other districts to pass by. Continued reports of fish in the district were received during the day and confirmed via aerial surveys. Based on this continued abundance of fish in the district, and increasing inside test fishing indices in Ugashik River, another 13 hour fishing period was announced effective at 1:00 a.m., July 11.

An aerial survey of the district was flown during the late morning of July 11. It yielded a count of 729 drift boats (a new district record) fishing the district. The boats were spread out all over the district but were still making fair catches late in the period. Set nets were also still making fair catches (200-300 fish per net along the "cutbank"). The fishery again closed on schedule at 2:00 p.m., July 11 to permit catch analysis.

The July 11 catch totaled 661,000 sockeye, bringing the cumulative harvest to 3.3 million, 79% of the preseason harvest forecast. Inside test fishing indices yielded an estimated 536-829,000 fish in the upper river destined for the escapement. Aerial scrutiny of Ugashik Lagoon yielded a count of 54,000 fish apparently milling just downstream of the counting towers.

The historical average peak day in the fishery has been July 11 over the period 1965-83. With that in mind and considering the current catch and escapement indicators as well as the apparent shortfall occurring concurrently in the Kvichak sockeye run, the plan was to keep the Ugashik District closed July 12 and possibly re-open it July 13. However, an aerial survey was flown of Ugashik

Lagoon at 2:00 p.m., July 12 in an attempt to visually quantify fish abundance in the upper river. The results of that survey indicated the escapement was already in the river and the goal was certain to be attained. An estimated 200,000 fish were observed in Ugashik Lagoon, and the upper six miles of river below the lagoon were full of fish visibly migrating upstream. Additional fish were still passing the inside test fishing site farther downstream, making it apparent that additional closures of the commercial fishery were not necessary to provide Ugashik escapement. With this as the basis, a short notice Emergency Order was issued at 3:00 p.m., July 12, opening the district to commercial fishing for 24 hours effective at 4:00 p.m., July 12.

The short notice opening caused a good deal of commotion amongst the fleet as they scrambled to get to preferred fishing areas, but overall it proved quite successful in making excess fish available to harvest. Over the course of the next three days, 24 hour extensions of the fishery were announced daily while awaiting confirmation that the escapement goal had passed the counting towers. By noon, July 15, over 500,000 sockeye had passed the towers so an announcement was issued opening the fishery through the end of the Emergency Order period and waiving district transfer impediments.

Catches remained high through July 16 and then tailed-off quickly (Table 15). Effort also dropped quickly after July 13. There were 743 boats registered for the district on that date but many only fished the first tide and then headed for home port due to the crowding and diminished prospects for upcoming days in the district. Sockeye landings continued throughout the remainder of July and August with the last recorded landing August 28. The peak sockeye catch in the district proved to be July 3; in catch per hour (63,723 fish), in catch per unit gear fished (1,865 fish), and in total daily catch (765,000 fish). That 765,000 sockeye catch broke the previous record for catch in a single day of 711,000 set July 11, 1985.

Escapement counts at the counting towers were characterized by a single large surge July 14-15 with only moderate daily passage levels thereafter (Table 25). Approximately 646,000 fish passed the counting tower over that two day interval. Counting continued through July 23 and then was terminated due to budget constraints. The estimate through July 23 was 924,678 sockeye. Over the 31 year period 1955-85, an average of 92.33% of the total annual escapement has been obtained by July 23, so the final 1986 count was derived by expanding the July 23 figure by an additional 7.67% to produce an estimated 1,001,492 fish. This escapement was more than 300,000 fish above the desired point goal (700,000) and 100,000 fish over the upper range (900,000), but it was comprised of fish from throughout the run (all major segments) and had an adequate sex ratio, 43% males and 57% females. Considering the complications involved it was a very good escapement.

Age comparisons between commercial catches and escapement were not possible until late in the season due to the lateness of the escapement's arrival at the counting towers. However, the escapement matched remarkably well with Ugashik District catch samples for each age group. The readings were independently done and compared post-season. Age Group 4(2) were represented in the catch at 7% and in the escapement at 6%. Age Group 5(3) made up 36% of both the catch and escapement. Age Group 5(2) comprised 44% of the catch and 41% of the escapement, and Age Group 6(3) contributed 13% to the catch and 16% to the escapement. These readings alone do not support or preclude the possibility that some interception of fish bound for other districts occurred in the Ugashik District. They do show that the Ugashik catch and escapement were remarkably similar in age structure.

The commercial fishery harvested 83% of the sockeye run in 1986, the second highest exploitation over the past 38 years (behind only the 86% taken in 1985) and well above the long-term average of 64%.

The district harvest of other salmon species totaled 127,000 fish, 3% of the total district salmon catch (Table 24). The king salmon catch of 3,000 fish was slightly below the 1967-86 average (Appendix Table 10) and approximately half the most recent 10 year average (6,000). The chum salmon catch of 99,000 fish was the fourth largest on record and more than twice the 1967-86 average (39,000). The catch of pink salmon barely exceeded 100 fish, a common situation in the district. The coho salmon catch totaled 26,000 fish, greater than the 1967-86 average (16,000) but less than the most recent 10 year average of 29,000. Some cohos reported in the Ugashik catch may well have been caught in the nearby Cinder River District and transported to the Ugashik District for sale because there was a lack of buyers in the Cinder River area.

Escapement surveys flown August 19 yielded drainage-wide indices of 4,000 king salmon, 13,000 chum salmon, and 6,000 coho salmon (Table 27). A follow-up survey August 25 yielded an additional 2,000 cohos. No final estimate of coho escapement was obtained. In each of the above cases escapement was deemed to be somewhat low, especially for chums. Concern for coho escapement, based on comparisons of current catch rates with historic rates resulted in a reduction in fishing time (from 5 days per week to 4 days per week) beginning August 12, and finally a complete closure of the fishery for the remainder of the season effective August 29.

A total of 36 buyers (a new record) operated in the district during the season. Despite six instances of daily catches exceeding 500,000 fish, there were no reports of available product in excess of available processing capacity. Nearly all the catch was either frozen on floating processors or tendered to other districts for processing. The only canning conducted in the district was a small hand pack operation at Ugashik village.

In retrospect, the season went quite well in this district. In spite of record levels of drift boat effort, late deployment and early curtailment of counting towers, elimination of the ADF&G Port Moller test fishing program, and concern for minimizing impact on adjacent districts in Bristol Bay, management actions were successful in obtaining the escapement at Ugashik and in providing for the second largest harvest in history. Enforcement in the district was improved over previous years and will need to be maintained in future years if effort levels remain high. More attention to monitoring king, chum, and coho fisheries will be required in future years in light of increasing effort and harvests. A permanent reduction in fishing time from 5 days per week to 4 days per week from July 17 through September 30 would help maintain a reasonable balance between catch and escapement in these times of greater effort and greater harvest efficiency.

Nushagak District

The preseason sockeye salmon forecast for the Nushagak District in 1986 was 3.8 million and included 1.7 million for Wood River, 0.7 million for Igushik River, and 1.4 million for Nuyakuk River (Table 1). This would have allowed a potential harvest of 2.1 million in sockeye, which closely matches the 1967-86 average catch of 2.2 million for this district. Upon close examination of the forecast age composition, it was likely that the Nuyakuk system might exceed the prediction. This was due, in part, to the large smolt outmigration in the parent year (28 million) and the good showing of 4(2) fish in 1985. With (48%) of the Wood River return expected to be three-ocean salmon, it appeared that spawner distribution could be a problem in 1986 with over-crowding in the

Agulowak and Agulukpak Rivers, because of the strong tendency for three-ocean fish to spawn in those two locations. A Department's variable escapement policy for the Wood River system allows adjustment of the goal from 1,000,000 to 800,000 inseason, to reduce crowding on the spawning grounds if it appears that the run contains over 60% three-ocean sockeye salmon. With the likelihood that the Nuyakuk sockeye run would be strong, and the probability that additional Wood River fish could be available for harvest if the escapement goal was reduced inseason, an aggressive approach to the Nushagak sockeye fishery seemed desirable. However, the reality of a weak and delayed king salmon run in 1986 and a much delayed sockeye run ultimately required a very different management strategy.

The 1986 Nushagak king salmon forecast predicted a return of 183,000, which closely matched the 20 year average return of 170,000. The first reported harvest was on May 27 when six kings were landed. Catches built slowly and by May 31 totaled less than 400. Through the first week of June, catches continued to build slowly and by June 7 totaled 8,400, about 80% of the average for that date. Daily monitoring of king salmon subsistence catches on local beaches confirmed that a very limited escapement had passed the commercial fishery. Due to the apparent delay in migration timing, and a desire to secure escapement from all portions of the run, the fishery was closed by emergency order at 9:00 a.m., Saturday, June 7. The order further specified that future fishing would only be by emergency order, and the regular five day per week fishing schedule was suspended.

By June 10, little king salmon escapement had occurred, but the age composition of the samples showed a higher proportion of older year classes (6(2) and 7(2)) than forecast, possibly indicating that a larger run was in progress. With the low catch to date, the apparent late run timing, and a large potential harvestable surplus still available, a 12 hour test opening was

announced for June 12. During the commercial fishery the wind rose to 30(+) knots N.W., the resulting harvest totaled over 21,000 (Table 6). Unfortunately the wind was blowing down the district and made the fish more available to catch but resulted in almost no additional escapement. Approximately 25 drift boats and 10 set nets took part in the opening. Through June 12 the king salmon harvest totaled approximately 30,000, closely matching the long-term average of 32,000 through June 15.

Subsistence catches on Kanakanak and Scandanavian Beaches averaged two fish and four fish per net, respectively, and the nets at Lewis Point averaged nine kings each for six nets (Table 10). These were not large catches, but indicated that some fish had moved through the commercial fishery. The king salmon escapement past the sonar site at Portage Creek totaled less than 1,000 as of June 15 (Table 26). After the fishery on June 12 there was little change in the king salmon escapement until June 18 when the wind switched to SSW and increased to 30 knots. Subsistence catches responded immediately and the nets averaged 38 kings each at Kanakanak Beach and 65 each at Scandanavian Beach. Based on the strong showing inshore, a 12 hour fishing period was announced for June 19. The resulting harvest of 6,600 kings was quite disappointing, and provided strong indication that the run was under forecast. After the good subsistence catches on the Dillingham beaches, it was assumed that the Lewis Point nets would also do well and that the king salmon escapement at the Portage Creek sonar site would show a substantial increase.

However, very few fish were observed at either location. It is likely that wind conditions drove the fish hard ashore near Dillingham making them more vulnerable to harvest, thus giving the impression of a larger volume than actually existed. Subsistence catches remained low for the next several days, but increased to 26 per net at Kanakanak and 10 per net at Scandanavian Beach on June

23. Catches rose to 26 per net at Lewis Point on June 25, but with the escapement total at Portage Creek less than 5,000, no commercial fishery could be considered. By this late date sockeye were starting to show in numbers in the subsistence harvest and there were two reports of jumpers in the commercial district.

The Nushagak outside test boat made its first trip on June 26 and caught sockeye at 15 of 21 stations, with the highest index (1,577) at Clarks Point (Table 9). Daily aerial surveys of the Wood, Nushagak, and Igushik Rivers confirmed that a very gradual buildup of sockeye and chum salmon was occurring in these systems. Test boat catches in the commercial district followed the same pattern.

By June 29 the sonar counts at Portage Creek totaled 12,000 sockeye and 46,000 chums. Test boat catches documented good numbers of sockeye in the upper commercial district and above, with the age composition of the samples closely matching the forecast for the Nuyakuk River. With the strong showing of sockeye in the lower Nushagak River and large potential harvestable surplus for that system, a further delay might have resulted in a large portion of the Nuyakuk stock becoming unavailable to the commercial fishery. Therefore, a 12 hour commercial fishery was announced for June 30. There was still serious concern with the low king salmon escapement, so only small mesh gear was allowed to provide additional protection to that species.

The harvest totaled 424,000 with about one half of the catch sockeye and one half chums, suggesting that a strong chum run was in progress (Table 16). The fishing effort totaled 380 drift boats and 253 set nets and it was later learned that this was the peak effort for the season. Test boat catches on July 2 were strong from Clarks Point to well inside the commercial district, and the age composition of those sockeye continued to match the Nuyakuk River forecast.

With only 231,000 accounted for (11% of the forecasted Nushagak catch) on July 2 and reports of strong catches in the "east side" districts, a 12 hour opening was announced for the Nushagak District for July 3. On an aerial survey twenty minutes after the fishery opened, the catch appeared lighter than the last period. However, catches dramatically improved later in the day and after the harvest was finally totaled, almost 700,000 sockeye and over 100,000 chums were landed. That single 12 hour opening was one of the largest ever recorded in Nushagak District.

With a large sockeye harvest and a very low escapement to date, it clearly was time to wait for a significant showing inshore before considering another commercial fishery. Test boat catches remained high and fairly consistent from July 4 to July 9. The Wood River sockeye daily escapement varied from 28 to 51,000 from July 4 to July 9. An aerial survey of the Igushik River on July 9 showed approximately 20,000 sockeye in clear water below the counting tower. Added to the 62,000 already past the tower, 82,000 or 41% of the escapement objective was assured. Test fish indices in the lower Igushik River were estimating a cumulative escapement of 130,000 as of July 7, or 65% of escapement requirements. A 12 hour commercial opening for the Igushik Section was announced for July 9. With a strong catch in Igushik Section, another 18,000 fish sighted below the tower on the aerial survey, high indices at the test fish site and approximately four days' fish in the river, a 24 hour extension was announced for the Igushik Section.

An early morning aerial survey of Wood River, on July 10, confirmed a better showing in the river (150,000) but still slow with only 90,000 past the tower through July 9. The Igushik River sockeye escapement looks very strong and 32,800 were observed in clear water below the tower. With almost 70% of escape-

ment objectives assured, commercial fishing was extended in the Igushik Section for an additional 24 hours.

Test boat catch indices in lower Wood River were improved on the morning of July 10, and were about the strength one would expect, with approximately 100 to 150,000 fish in the river. By midday, July 10, test fishing indices increased tremendously with a 57,000 index point set (the largest in the history of the program) at Grassy Island (Table 9). Catches continued strong at Nushagak, Combine Flats and at Ekuk. With a strong sockeye escapement in progress on the Nushagak River past the Portage Creek sonar site, on the Igushik River, and at several "east side" systems, it was likely that the run was probably late. After a late afternoon survey of the Wood River, a 12 hour fishing period was announced for Nushagak Section on July 11. Through July 10 the Wood River sockeye age composition from all of the samples to date, totaled 63% three-ocean fish. Throughout the season there was a gradual increase of three-ocean fish in each group of new samples.

An aerial survey on the morning of July 11 showed approximately 100,000 sockeye in clear water below Wood River tower with indications of good numbers of fish in muddy water below. The commercial fishery was doing quite well despite high winds and rough seas. With 382,000 sockeye past the Portage Creek sonar site and an additional 157,000 observed in clear water below, the Nushagak/Nuyakuk River escapement goal was assured. The Igushik tower escapement totaled 135,000 with a strong showing of sockeye (33,000) below the tower. With continued good indices past the test fish site in the lower river, the Igushik escapement objective was also assured. The high percentage of three-ocean fish in the Wood River escapement (63% through July 10) made it desirable to reduce the escapement objective for that system from 1,000,000 to 800,000 per the Department's variable escapement policy, to avoid overcrowding in the limited river spawning areas.

Due to the good showing of fish in all three major river systems fishing time in the Nushagak District was extended for an additional 24 hours on July 12. By July 13, the Nushagak/Nuyakuk, and the Igushik River sockeye escapement goals were assured. The Wood River sockeye escapement totaled 660,000, or 82% of the revised goal of 800,000. With the Wood River escapement rate matching the curve necessary to achieve the desired goal, and continued strong catches in the commercial fishery, an additional 25 hour extension was announced for July 14. High winds on July 14 reduced the efficiency of the fleet and contributed additional sockeye into the escapement. With Wood River at 90% of the desired escapement goal and continued strong catches in the commercial district, an additional 24 hour extension was announced for July 15. By the evening of July 15, with the strong likelihood that the Wood River escapement objective would be met by the end of the sockeye run, an extension of 38 hours was announced for July 15 to 17. On Friday, July 18, the sockeye escapement had been achieved in all of the major river systems in the Nushagak District, and with good numbers of fish still available for harvest and excess to escapement needs, the fishery was extended for an additional 48 hours over the weekend.

During the last week of July, both pink and coho salmon catches fell well behind the average catches for that period. By July 30, the pink salmon harvest was 208,000, well below the long-term average of approximately one million for that date. Much of the fleet continued to fish large mesh gear for coho, sockeye and chums so the pink harvest was incidental but still well below the expected rate. The pink salmon escapement totaled 39,000 past the Portage Creek sonar site as of July 30, only 8% of the average since the inception of pink salmon sonar enumeration in 1980. Coho catches through July 30 totaled 38,000, also less than the average of 52,000 for that date. The coho escapement past the sonar site totaled 4,200 through July 30, and the average is 19,000 for the same time

period. Other pink salmon runs statewide were demonstrating late run timing but several appeared extremely weak, so a reduced fishing schedule was deemed necessary to insure that a viable escapement was achieved. On the high seas, coho catches by Japanese vessels started out strong, but fell off sharply. Because fishing success of that fleet often correlates with coho run strength in the inshore fishery, this information suggested caution in management of the coho stocks as well.

On July 31 the Nushagak District was closed by emergency order for a 24 hour period, and the regular five day per week fishing schedule was reduced to two 24 hour periods per week, 9:00 a.m. Monday to 9:00 a.m. Tuesday, and 9:00 a.m. Thursday to 9:00 a.m. Friday. Both pink and coho escapements improved only slightly with the additional closure and the poor catches when the fishery reopened on August 4 left no other option but to close the commercial fishery for an indefinite period.

The pink salmon run in the Nushagak District was obviously very weak and the commercial harvest stood at 283,000 through August 5, well below the average catch for that date of over 1.4 million. The pink salmon escapement totaled 72,000 through August 5, compared to the average of over 1 million for the same date. The coho harvest totaled 74,000 through August 5, and closely matched the average of 78,000 for the same time period. However, the coho escapement of 24,000 was below the average of 40,000 for that date. If run timing was normal, approximately 53% of the total coho catch should have been accounted for by August 5. With approximately one-half of the run accounted for (100,000) and only 16% of the escapement achieved, the majority of the remaining coho were needed to reach the goal of 150,000 by the season's end.

When the final numbers were tallied post-season, the Nushagak sockeye harvest totaled 2.8 million, slightly over the 20 year average of 2.2 million, and well below the recent 10 year average of 3.6 million. The king salmon harvest of 64,000 was below the 20 year average of 88,000 and well below the recent 10 year average of 114,000. The chum salmon catch of 462,000 was 41% greater than the 20 year average of 328,000 and closely matched the recent 10 year average of 465,000. Pink salmon returns to Nushagak District were very poor, and the 1986 harvest of 281,000 was the lowest even year since 1972 and since orders of magnitude less than the 20 year average catch of 1.5 million, as well as the recent 10 year average of 2.3 million. The 1986 coho catch of 73,000 was similar to the 20 year average harvest of 79,000, but was 47% less than the recent 10 year average catch of 139,000.

In terms of average sockeye production, the Wood River system has produced 50% of the total run to this district for the past 20 years, with Igushik contributing approximately 20% and Nuyakuk 25%, with minor amounts added by the Nushagak/Mulchatna and Snake River systems. The 1986 season was the exception with the Nuyakuk system contributing 40% of the total, Wood River and Igushik River accounted for 37% and 19%, respectively. The importance of the Nuyakuk River's sockeye contribution to the Nushagak cannot be understated, as it is the key to increased and sustained higher levels of production for this district.

Togiak District

The 1986 sockeye salmon forecast for the Togiak River was 521,000, of which 61% were expected to be 3-ocean fish and 39% 2-ocean fish (Table 2). With the sockeye escapement goal of 150,000, a harvestable surplus of 371,000 was potentially available in the Togiak River Section. Smaller sockeye runs to other drainages in the district (primarily Kulukak Section) do occur, but these were not included in the forecast because age composition and escapement data used to generate the forecast is unavailable.

Togiak District is managed differently than other areas of Bristol Bay using a fixed fishing schedule of four days per week in the Togiak Section and five days per week in Kulukak, Osviak, Matogak, and Cape Peirce Sections. Although the fishing schedule may be adjusted by emergency order as needed to achieve desired escapements, the regular fishing schedule was not altered in the early part of the season.

The first landings of the 1986 season occurred on June 10 and the harvest was allowed to continue with the regular fishing schedule until July 1 (Table 18). At that time an emergency order was issued amending the weekly schedule in the Togiak and Kulukak Sections of the district, effectively shortening them by 24 hours and 48 hours, respectively, beginning 9:00 a.m., Thursday, July 3 (Table 11). This action was taken based on the commercial catch rate, which stood at 26,000 through June 27. Nearly half of this harvest (45%) was taken in the Kulukak Section while 52% was harvested in the Togiak River Section. The harvest was approximately 7% of the season's total projected harvest and yet an aerial survey of both the lower Kulukak and Togiak Rivers on June 29 indicated almost no escapement (less than 1,000) sockeye in either river. Because the cumulated harvest was 5% higher than the long-term average through this date, and virtually no

escapement had occurred, an adjustment of the weekly fishing schedule was necessary. Harvests in the Cape Peirce, Osviak, and Matogak Sections were predominantly chum salmon, and that species appeared to be strong in all districts of Bristol Bay, so the weekly fishing schedule remained unchanged there.

On July 6, an aerial survey of the Togiak and Kulukak Rivers was flown to assess escapement. Although waters were somewhat turbid, results showed 2,200 sockeye and 4,600 chums in the lower Togiak River, and 4,400 sockeye and 1,900 chums in the Kulukak River with fish already up to Kulukak Lake. This was not a dramatic change, but the four-day closure had obviously helped increase the escapement. With good signs of fish beginning to show in both rivers, the fishery was allowed to resume on Monday, July 7, at 9:00 a.m.

On July 9 another aerial survey was flown to monitor escapement in the Togiak and Kulukak Rivers as well as assess fishing effort and success in the two sections. Results showed 38 drift boats and 42 set nets in Togiak Section, although many of the set nets observed (17) at Rocky Point were split into two 25-fathom pieces. In Kulukak Section 12 set nets and 24 drift boats were observed fishing mostly the southwestern corner of the section. Commercial catches in both Kulukak and Togiak River Sections appeared good, while the river surveys showed only 5,100 sockeye in Kulukak River and 3,350 sockeye in Togiak below the tower. Escapement past Togiak tower through 2:00 p.m., July 9, totaled 1,212 while the commercial harvest through July 8 was 123,876, or 33% of the projected season harvest.

Age composition analysis of commercial catch samples showed an apparent lack of 2-ocean fish in the run thus far, which suggested a total run potentially 30-40% less than forecast. In consideration of this possibility and the current catch/escapement ratio, an additional closure was deemed necessary to assure adequate sockeye escapement into the Togiak and Kulukak Rivers. An emergency

order issued at 3:00 p.m., July 9, closed the Togiak River and Kulukak Sections from 9:00 p.m., July 9, until 9:00 a.m., Monday, July 14 (Table 11). The regular weekly fishing schedule remained in effect for the Matogak, Osviak, and Cape Peirce Sections.

From July 9-13 escapement counts past the tower remained slow with a cumulative total of 6,804, or 4% of the season total, which was significantly lower than the long-term average of 26% through this date. On Sunday, July 13, an aerial survey of Kulukak and Togiak Rivers was flown to observe any change in escapement rates due to the previous four-day closure. Survey conditions were fairly good and it was apparent that Kulukak escapement had picked up slightly while Togiak River showed dramatic improvement, especially above the Ongivinuck River tributary. Aerial counts totaled 22,300 sockeye and 6,400 chums in Togiak River, while Kulukak had 10,100 sockeye and 1,500 chums.

The district harvest through July 11 amounted to 159,000 with 51% reported from the Kulukak Section. Age composition continued to show 2-ocean fish comprising only 6% of the run, well below the forecasted 39% 2-ocean component. Samples from the Kulukak catches were nearly identical to those from the Togiak River Section with respect to age composition, and from the fleet distribution and set net success in Kulukak, it appeared likely that fish bound for Togiak River were being intercepted in the Kulukak Section. In light of these considerations, an emergency order was issued July 13 further reducing fishing time in the Kulukak Section, essentially extending the closure for an additional 24 hours for this section only. It was reasoned that this measure would afford additional protection to the weak Kulukak run while simultaneously reducing potential interception of Togiak River stocks.

Throughout the week of July 14-20, the sockeye escapement began to build and by Sunday, July 20, the tower count totaled 48,000, but still 30% below the

cumulative historic average for this date. Meanwhile, the commercial catch had reached 147,000 through July 20. Normally 77% of the harvest has been landed by this date in an average year. A survey of Togiak River was flown July 20, yielding a total count of 54,800 sockeye below the tower. The survey was flown under excellent conditions and was comprehensive covering nearly every channel and side slough. It was noted that many of the fish were schooled in the side sloughs and off the mouths of tributary streams, apparently not destined for Togiak Lake, and therefore not apt to be counted at the tower. Fish in the lower section (19,500) were mixed species, with chums accounting for an estimated 15% and smaller numbers of kings, pinks, and cohos present. Combining the cumulative tower count and the estimated number of fish in the river below the tower produced a total sockeye escapement estimate of nearly 100,000. There were indications that the sockeye run throughout Bristol Bay was 5-6 days later than normal and with this in mind, fishing was allowed to resume on schedule at 9:00 a.m., July 21. On July 22 bad weather forced most of the drift fleet to quit fishing again, further enhancing escapements.

Another 36,000 fish were landed in the Togiak Section during the open period July 21-24, bringing the cumulative total to 182,000, while only 2,000 fish were taken from the Kulukak Section during the same period. This brought the total district catch to 291,000, or 78% of the season's project harvest. After waiting for the effects of the four-day closure, an aerial survey of the Togiak River was made on July 27 to see if escapements had improved. The week that had elapsed since the previous survey allowed the fish more time to "color up", and it became apparent that the heavy concentrations of fish observed in the lower river were predominantly chum salmon.

While it appeared that we were achieving good escapements to the tributaries and main river channels, the current sockeye escapement rate to the lake system

was not adequate to meet the point goal of 150,000. The tower count totaled 98,514 through July 27, and the statistical run model, based on historical catch per unit of effort data, was projecting a total escapement of 123,000. Considering these indicators and the late date, a closure of the Togiak River and Kulukak Sections was necessary to obtain additional escapement from the remaining portion of the run. An emergency order was issued at 3:00 p.m., July 27 closing the two sections from 9:00 a.m., Monday, July 28 until 9:00 a.m., Monday, August 4. The western sections remained open and many of the drift boats continued to harvest chum salmon from those areas.

Escapement rates past the tower remained relatively strong throughout the week with counts ranging from 5-9,000 per day. This unexpected strength in the latter part of the season boosted the total to 150,000 through August 3. With the escapement goal finally achieved past the tower, fishing was allowed to resume Monday, August 4 on the regular schedule. The final sockeye catch totaled 304,000 for the entire district, just slightly above the 1967-86 average, but about 30% below the most recent 10-year average (442,000). The Togiak Section catch amounted to 192,000 while the Kulukak Section compromised 94,000 or 31% of the total.

Due to severe fiscal constraints, the Togiak tower crew was terminated on August 1, but through the cooperative efforts of USFWS personnel with the Togiak Wildlife Refuge, escapement counting at the tower continued through August 8 when the final count totaled 168,384.

When the tower count was combined with the estimated escapement in the tributaries and main river, the total cumulative sockeye escapement was estimated at 203,000. This figure plus the Togiak Section catch yielded a total run of 395,000, which was only 76% of the preseason forecast.

The 1986 Togiak District king salmon catch of 20,000 was 19% less than the 1967-86 average and 36% less than the most recent 10-year average. Only minimal aerial escapement estimates for kings were made on the Togiak River this season, and the survey was slightly after peak of spawning. The counts were about 1/3 of the 1985 estimates for the same areas, and indicated a range of 5-10,000 as a total district escapement. With 8,000 selected as the point estimate, this year's king salmon escapement was 62% less than the most recent 10-year average and equal to the lowest on record (1969). It is apparent that additional management efforts will be necessary to reverse the declining trend in king salmon runs to this district.

The chum salmon run in Togiak, comprised of a 270,000 commercial catch and a 310,000 district escapement estimate, ranked slightly above (6%) the recent year average (Table 18). The reduced fishing schedule obviously provided ample protection for Togiak River chum stocks, while the effects of 5-day per week fishing in the Matogak, Osviak, and Cape Peirce Sections were not documented since district spawning ground surveys were not flown this season. Escapement levels were approximated using the 1976-85 mean catch/escapement proportion, which produced an estimate 7% greater than the most recent 10-year average. The estimate was consistent with incidental observations of chum salmon abundance made during management surveys.

Pink salmon are not a commercially targeted species in Togiak and the catch of 24,500 was very near the 1967-86 average for the even year return to this district (Table 18). Escapement in the Togiak River was estimated at 80,000 from incidental observations made during a coho survey.

Due to the increased interest in coho salmon and the growing commercial fishing effort in recent years, management of this species has become more intensive and increasingly difficult with the limited data available. Through

Friday, August 15, the district coho salmon catch was 11,000, nearly half the 1977-85 average harvest for that date. Because 31% of the total season's harvest normally has been landed by that date, there already was concern for the coho run, which seemed to be following the same weak trend exhibited in other districts of Bristol Bay. The amended fishing schedule (three days per week in Togiak and Kulukak) was still in effect, but the exploitation rate still appeared too high for the weak run in progress.

By August 19 the entire district coho catch had increased to nearly 15,000 fish, while the cumulative Togiak Section catch through this date was only 7,100 fish. This was significantly less than the mean cumulative catch for the same time period, which for Togiak Section was approximately 20,000 fish. The late season fishing effort was beginning to focus on Togiak cohos and effort was currently estimated at 60 drift gill nets and 30 set nets. This was only about half of what the effort was potentially expected to be. It became apparent that more protection was necessary to ensure adequate escapement during the peak abundance period. Therefore, fishing time in the Cape Peirce, Osviak, and Matogak Sections was shortened by 48 hours beginning 9:00 a.m., Thursday, August 21. The amended fishing schedule made those outlying western sections conform to that in the Togiak and Kulukak Sections which provided four days per week for escapement and three days for a moderate harvest.

On Thursday, August 21, an aerial survey of the main Togiak River was flown in an attempt to estimate coho escapement for the first time this season. Fish densities were light and it was difficult to count in the upper river due to spawning sockeye and pink salmon. Escapement was estimated at 5-10,000 with most of the strength in the lower river. Fish were also just beginning to show in the lower five miles of Kulukak River, and it appeared likely that the timing of the four-day closure would bolster escapements in both rivers.

The entire district opened to commercial fishing at 9:00 a.m., August 25, but weather was deteriorating and by 4-5:00 p.m. most boats had quit fishing again. Many of the set nets did not get wet, as winds gusting to 40 knots made deployment impossible. Winds were even stronger the next day and no deliveries were reported despite the open period. By Wednesday afternoon August 27, bad weather had subsided and boats were able to get out and fish until the scheduled closure on August 28. One of the two processors subsequently quit buying fish at the close of the period and the remaining processor bought fish through the following week (September 1-4) before quitting. Meanwhile, an Anchorage based operator made arrangements to fly out fish if the run strength should unexpectedly pick up. An additional 620 fish were landed September 9-10 bringing the final district catch to 48,440 (Table 18).

Although weather and water conditions (and funding) severely hampered efforts to obtain escapement estimates, a portion of the Togiak River drainage was surveyed indicating a total spawning population of 30,200 for the Togiak and Kulukak Rivers. Coho escapement estimates from past years are not directly comparable due to the difference in survey coverage each year, but the 1986 escapement generally ranked 35-50% lower than the average for the past seven years (1980-86) for which data is available.

1986 SUBSISTENCE SALMON FISHERY

Historically, large numbers of salmon were harvested in Bristol Bay for feeding dog teams, but this practice was greatly reduced with the introduction of the snow machine. In order to document the subsistence removal of salmon, a permit system was initiated in 1963. The permit system has been refined and expanded and this year a total of 933 were issued (Table 42). It is felt that the majority of the salmon caught for subsistence are now being reported, the exception being those fish taken by commercial vessels that are consumed on the fishing grounds. Growth of the local population, a yearly influx of non-watershed residents, and a renewed interest in sport dog mushing have resulted in an increase in the subsistence harvest of salmon in Bristol Bay.

Competition for resources and limited available fishing space resulted in regulations restricting subsistence fishing in the Naknek River and Iliamna-Lake Clark drainages to only those persons domiciled in those areas. In 1982 a personal use fishery was allowed for the first time in Bristol Bay. It gave non-traditional subsistence users and non-watershed residents the opportunity to harvest salmon in times of surplus. The personal use fishery was restricted to the Naknek River drainage, and was allowed, only when the sockeye escapement had reached 900,000 fish.

In February of 1985 the Madison decision by the Alaska Supreme Court changed many subsistence regulations statewide. The Madison decision stated that the present subsistence law did not specify rural, therefore the Board of Fisheries had exceeded its regulatory authority by limiting participation and that all State residents qualify and are eligible. It further stated that any stock fished for subsistence in the past must be opened for subsistence again and that this activity could not be restricted until all non-subsistence uses (i.e.: the commercial fishery) had been eliminated.

The Madison decision therefore eliminated the watershed only restrictions and abolished the personal use fishery. The results of this court action were not immediately recognized by the general public and only a small increase in the number of permit holders was observed in the 1985 subsistence salmon fishery. However, as a result of the Madison decision, the Federal government declared Alaska's subsistence law not in compliance with the Alaska National Interest Lands Act, and threatened to take over management responsibility for fish and wildlife resources. In May, 1986, the Alaska legislature adopted major changes in the state statute in an effort to retain management authority. The changes made in 1986 confirmed that subsistence uses of fish and game be limited to customary and traditional uses by residents of rural areas. It also confirmed subsistence as a priority over all other uses. Finally, it stated that hunting and fishing regulations should provide for subsistence uses.

Since the Board of Fisheries did not have time to meet before the 1986 fishing season and adopt regulations implementing the new law, there was no immediate effect in the Bristol Bay area. Subsistence fishing in the Naknek River and Iliamna-Lake Clark drainages continued to be restricted to residents domiciled in those areas. A personal use fishery was in effect in the Naknek River as well. All state residents were permitted to participate in subsistence fishing in other drainages.

Subsistence fishermen in Bristol Bay harvested 176,000 salmon in 1986 (Table 42). This was nearly the same as the recent (1977-86) average. Most fishermen were able to meet their subsistence requirements without difficulty although informal conversations with residents of the Lake Clark drainage indicated greater effort than usual was required due to weak run strengths.

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TABLES

Table 1. Comparison of inshore sockeye salmon forecast versus actual run, escapement goals versus actual escapements, and projected versus actual commercial catch, by river system and district, in thousands of fish, Bristol Bay, 1986.

District and River System	Number of Fish in Thousands									
	Inshore Forecast			Escapement 2/				Inshore Catch 2/		
	Forecast 1/	Actual	Percent Error	Goal	Range	Actual	Percent Deviation	Projected Harvest	Actual	Percent Deviation
NAKNEK-KVICHAK DISTRICT										
Kvichak River	4,463	1,966	127	5,000	4,000- 6,000	1,179	324	0	787	-100
Branch River 3/	226	398	- 43	185	170- 200	230	- 20	41	168	- 76
Naknek River	3,178	3,913	- 19	1,000	800- 1,400	1,978	- 49	2,178	1,935	13
Total 4/	7,867	6,277	25	6,185	4,970- 7,600	3,387	83	2,219	2,890	- 23
EGEGIK DISTRICT	5,416	6,161	- 12	1,000	800- 1,200	1,152 5/	- 13	4,416	5,009	- 12
UGASHIK DISTRICT	4,896	5,945	- 18	700	500- 900	1,016 6/	- 31	4,196	4,929	- 15
NUSHAGAK DISTRICT										
Wood River	1,701	1,861	- 9	1,000	700- 1,200	819	- 2 7/	701	1,042	- 33
Igushik River	703	700	0	200	150- 250	308	- 35	503	392	28
Nuyakuk River	1,437	1,910	- 25	500	300- 700	822	- 39	937	1,088	- 14
Nushagak-Mul. Sys. 3/		382		50	40- 60	168			214	
Snake River 3/		39		40	30- 50	17			22	
Total 4/	3,841	4,892	- 21	1,790	1,220- 2,260	2,134	- 16	2,141	2,758	- 22
TOGLAK DISTRICT	521	395	32	150	140- 250	271 8/	- 11 9/	371	304	22
TOTAL, BRISTOL BAY 4/	22,541	23,850	- 5	9,825	7,630-12,210	7,960	23	13,343	15,890	- 16

1/ Final Bristol Bay sockeye salmon forecast of inshore run for 1986.

2/ Escapement data is final, while catch data is preliminary.

3/ These river systems cannot be managed separately from the major systems in the district. Consequently, the exploitation rates merely reflect those allowed for the major systems in the district; the corresponding escapements do not coincide with escapement levels which would be achieved if these systems could be managed independently.

4/ Due to rounding, the totals may not equal the sum of the district totals.

5/ Including sockeye observed in King Salmon River.

6/ Including sockeye run to Mother Goose and Dog Salmon River systems.

7/ This reflects the adjusted escapement goal (800,000) in 1986 per the Department's variable escapement goal strategy for this river system.

8/ Including sockeye runs to the various tributaries and minor river systems of Togiak District.

9/ This reflects the published escapement goal for Togiak Lake and the actual 1986 escapement of 168,384.

Table 2. Inshore forecast of sockeye salmon return by age class, river system, and district, in thousands of fish, Bristol Bay, 1986.

District and River System	Age Class (Brood Year)			Age Class (Brood Year)			Total
	4(2) (1982)	5(3) (1981)	2-Ocean	5(2) (1981)	6(3) (1980)	3-Ocean	
NAKNEK-KVICHAK DISTRICT							
Kvichak River	1,226	2,257	3,483	241	739	980	4,463
Branch River	127	18	145	66	15	81	226
Naknek River	558	960	1,518	935	725	1,660	3,178
Total	1,911	3,235	5,146	1,242	1,479	2,721	7,867
EGEGIK DISTRICT	304	2,867	3,171	388	1,857	2,245	5,416
UGASHIK DISTRICT	454	2,378	2,832	1,342	722	2,064	4,896
NUSHAGAK DISTRICT							
Wood River	799	86	885	774	42	816	1,701
Igushik River	136	88	224	456	23	479	703
Nuyakuk River	176	68	244	1,157	36	1,193	1,437
Total	1,111	242	1,353	2,387	101	2,488	3,000
TOGLAK DISTRICT	143	61	204	299	18	317	521
TOTAL BRISTOL BAY 1/							
Number	3,923	8,783	12,706	5,658	4,177	9,835	22,541
Percent	17.40	38.96	56.37	25.10	18.53	43.63	100.00

1/ Sockeye salmon of several minor age classes are expected to contribute an additional 1-2% to the total return.

Table 3. Inshore run of sockeye salmon by age class, river system and district, in thousands of fish, Bristol Bay, 1986. 1/

District and River System	4(2)	5(3)	2-Ocean	5(2)	6(3)	3-Ocean	Total
NAKNEK-KVICHAK DISTRICT							
Kvichak River							
Number	441	912	1,353	223	385	608	1,961
Percent	22.5	46.5	69.0	11.4	19.6	31.0	100.0
Branch River							
Number	171	51	222	165	9	174	396
Percent	43.2	12.9	56.1	41.7	2.3	43.9	100.0
Naknek River							
Number	184	463	647	2,480	772	3,252	3,899
Percent	4.7	11.9	16.6	63.6	19.8	83.4	100.0
Total							
Number	796	1,426	2,222	2,868	1,166	4,034	6,256
Percent	12.7	22.8	35.5	45.8	18.6	64.5	100.0
BEGGIK DISTRICT							
Number	1,005	3,299	4,304	948	876	1,824	6,128
Percent	16.4	53.8	70.2	15.5	14.3	29.8	100.0
UGASHIK DISTRICT							
Number	414	2,198	2,612	2,505	781	3,286	5,898
Percent	7.0	37.3	44.3	42.5	13.2	55.7	100.0
NUSHAGAK DISTRICT							
Wood River							
Number	498	83	581	1,144	95	1,239	1,820
Percent	27.4	4.6	31.9	62.9	5.2	68.1	100.0
Igushik River							
Number	53	4	57	826	55	881	938
Percent	5.7	0.4	6.1	88.1	5.9	93.9	100.0
Nuyakuk River							
Number	98	5	103	1,701	124	1,825	1,928
Percent	5.1	0.3	5.3	88.2	6.4	94.7	100.0
Total							
Number	649	92	741	3,671	274	3,945	4,686
Percent	13.8	2.0	15.8	78.3	5.8	84.2	100.0
TOGIK DISTRICT							
Number	95	6	101	283	10	293	394
Percent	24.1	1.5	25.6	71.8	2.5	74.4	100.0
TOTAL BRISTOL BAY 2/							
Number	2,959	7,021	9,980	10,275	3,107	13,382	23,362
Percent	12.7	30.1	42.7	44.0	13.3	57.3	100.0

- 1/ The inshore run data does not include the 1986 Japanese high seas catch of maturing Bristol Bay sockeye or the 1985 Japanese catch of immatures.
- 2/ Approximately 106,000 additional sockeye salmon of several minor age classes returning in 1986 are not included in this total, nor are 185,000 sockeye that returned to the Nushagak-Mulchatna and Snake River drainages.

Table 4. Inshore commercial catch and escapement of sockeye salmon, Bristol Bay, 1986. 1/

District and River System	Number of Fish		Total Run
	Catch	Escapement	
NAKNEK-KVICHAK DISTRICT			
Kvichak River	786,683	1,179,322	1,966,005
Branch River	168,350	230,180	398,530
Naknek River	1,934,861	1,977,645	3,912,506
Total	2,889,894	3,387,147	6,277,041
ELEGIK DISTRICT	5,008,779	1,151,750 2/	6,160,529
UGASHIK DISTRICT			
Ugashik River		1,001,492	
Dog Salmon River		9,780	
Mother Goose System		4,310	
Total	4,928,502	1,015,582	5,944,084
NUSHAGAK DISTRICT			
Wood River	1,004,321	818,652	1,822,973
Igushik River	631,233	307,728	938,961
Nuyakuk River	1,122,176	821,898	1,944,074
Nushagak-Mul. Sys.	+	168,340	168,340
Snake River	+	16,780	16,780
Total	2,757,730	2,133,398	4,891,128
TOGIK DISTRICT			
Togiak Lake		168,384	
Togiak River and Tributaries		35,000	
Kulukak System		42,800	
Other Systems 3/		25,000	
Total	303,677	271,184	574,861
TOTAL BRISTOL BAY	15,888,582	7,959,061	23,847,643

- 1/ Inshore catch and apportionment by river system to the Naknek-Kvichak and Nushagak Districts is preliminary, while escapements are final.
- 2/ Egegik tower count plus 430 sockeye from King Salmon River.
- 3/ Includes Ungalikthluk, Osviak, Matogak, and Slug River systems when survey data is available.

Table 5. Inshore commercial catch and escapement of pink salmon,
Bristol Bay, 1986. 1/

District and River System	Number of Fish		
	Catch	Escapement	Total Run
<hr/> NAKNEK-KVICHAK DISTRICT <hr/>			
Kvichak River		146,000	
Branch River		286,000	
Naknek River			
Total	85,723	432,000	517,723
<hr/> EGEGIK DISTRICT <hr/>			
Total	2,656	2,500	5,156
<hr/> UGASHIK DISTRICT <hr/>			
Total	101	350	451
<hr/> NUSHAGAK DISTRICT <hr/>			
Nushagak River		72,189 2/	
Total	280,623	72,189	352,812
<hr/> TOGIAC DISTRICT <hr/>			
Togiak Section	18,555	80,000 3/	
Kulukak Section	915		
Osviak Section	1,616		
Matogak Section	3,423		
Total	24,509	80,000	104,509
TOTAL BRISTOL BAY	393,612	587,039	980,651

1/ Inshore district catches are preliminary, while escapements are final.

2/ Sonar count at Portage Creek through 8/17.

3/ Includes main Togiak River only.

Table 6. Summary of district sockeye salmon test fishing indices in the Naknek-Kvichak District by index area and date, Bristol Bay, 1986. 1/

Index Area	Date									
	June 23	June 24	June 25	June 27	June 28	June 29	June 30	July 1	July 7	July
Naknek River Mouth	140 2/	149	213	429 2/	261 2/	0 3/	0	717 5/		
Pederson Point	20 3/	4		271 3/	0		0			176 3/
Outbank & Graveyard		6			0					192 2/
Salmon Flats		0 2/			0					0 2/
Gravel Spit		6			0					0
Ships Anchorage		15 2/					144 3/	12 3/		548 3/
Half Moon Bay		0			0			3 3/		217 3/
Middle Naknek	36		77 3/	28 2/	0 2/	44 3/	12 2/	207 3/		
Johnson Hill				4	0	55 2/				
Division Buoy	0	6	114	12		0	41			
Deadman Sands							0			
Low Point					3 2/	9 2/	134 4/		241 2/	
Middle Bluff										
Other 5/									37 3/	

1/ All indices expressed in number of fish/100 fathom hours to the nearest whole index point.

2/ Average of two drifts in the same general index area.

3/ Average of three drifts in the same general index area.

4/ Average of four drifts in the same general index area.

5/ Two drifts were made several miles south of Deadman Sands and another drift was made several miles south of the middle of the outer N-K boundary.

Table 7. Summary of district sockeye salmon test fishing indices in the Egegik District by index area and date, Bristol Bay, 1986. 1/

Index Area	Date			
	June 24	June 29	July 1	July 4
Middle Bluff			1,544	
Two Miles North of North Marker	195	118	3,211	5,284
North Marker (Offshore)	14	5	905	584
North Flats				1,099
Outer Ships Channel	51	156	86	65
Entrance Buoy		280	17	
Middle Outer Line	0	88	127	48
South Marker (Offshore)	18	156	7	
Two Miles South of South Marker		0		
Red Bluff	37	0	123	1,763

1/ All indices expressed in number of fish/100 fathom hours to the nearest whole index point.

Table 8. Summary of district sockeye salmon test fishing indices in the Ugashik District by index area and date, Bristol Bay, 1986. 1/

Index Area	Date				
	June 25	June 28	June 29	June 30	July 1
Two Miles North of Cape Grieg		33			7
Cape Grieg (Beach)	0	87			277
North Marker (Offshore)	0				
Two Miles North of Smoky Point			3		
Smoky Point					289
Bell Buoy	14	2			90
Mid Outer Line	0				
Two Miles North of Cape Menshikof		21			300
Cape Menshikof	0	13			
Two Miles West of Cape Menshikof		52			
Two Miles South of Cape Menshikof					198
Three Miles South of South Spit	0	270			846
Mid Channel South Spit					152
Pilot Point					0
Muddy Point					0
Dog Salmon River	0		7	6	9

1/ All indices expressed in number of fish/100 fathom hours to the nearest whole index point.

Table 9. Summary of district sockeye salmon test fishing indices in the Nushagak District by index area and date, Bristol Bay, 1986. 1/

Index Area	June 26		June 27		June 28		June 29	July 2	July 4
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	P.M.	P.M.	P.M.
Nushagak River:									
Picnic Point			0				11,394 3/	8,100	
Wood River 2/									
A			339						
B									
C			0				67		
Peter Pan	360 3/		0 3/		171				218
Kanakanak Beach	44		80				0	0	880
Grassy Island	0 4/		0		0		903 3/	2,817	5,352
Nushagak Point	44				1,772	36 3/	4,655	3,730 3/	534
Coffee Point	28 3/	0		0 3/					3,771
Combine Flats		806 4/	206	1,018		5,496 3/	4,425 3/	7,200	23,467
Queen Slough		271 3/		1,239		672	218		
Clarks Point		1,577		800 3/		4,733 3/	2,240 3/	4,445 3/	5,600
Ekuk Bluff		483 4/		733 6/		949 5/	255 5/	4,818 4/	7,483 3/
Schooner Ch. N.W.		70 3/		43		273		564 3/	
Schooner Ch. S.E.						0			
Ships Ch. N.W.							95		64
Ships Ch. S.E.						60 3/			
Middle Ch. N.W.				25			250		
Middle Ch. S.E.						308			
West Ch. N.W.									
West Ch. S.E.									

(continued)

Table 9. (continued)

Index Area	July 5		July 6		July 7		July 8		July 9	July 10	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	A.M.	P.M.
Nushagak River:											
Picnic Point	13,029	6,750		13,200					12,923	9,750	
Wood River 2/											
A	4,983	864	5,760	3,600	5,538		1,646		3,358 3/	8,000	
B	1,800	2,181	1,385	1,200	185		1,600		1,742	3,200	
C		6,750		8,100					9,857	1,448	
Peter Pan	4,560	3,300 3/	1,050 3/	1,200	1,355		800		2,118	3,250	
Kanakanak Beach		4,800	800	643		1,742	3,900		11,100	1,920	
Grassy Island		4,042	5,760	8,100	6,857		17,625		18,632	57,241	
Nushagak Point					1,920		19,333			5,280	
Coffee Point								120 3/			1,400
Combine Flats					5,714		9,529				14,000
Queen Slough					5,077						
Clarks Point						2,057	2,100	341 3/			6,571
Ekuk Bluff					534 3/	1,200	1,191 3/				15,900 3/
Schooner Ch. N.W.											
Schooner Ch. S.E.											
Ships Ch. N.W.					48		351				
Ships Ch. S.E.						0					
Middle Ch. N.W.					84		640				179
Middle Ch. S.E.						0					
West Ch. N.W.					245			1,040			154
West Ch. S.E.											

1/ All indices expressed in number of fish/100 fathom hours to the nearest full index point.

2/ Wood River: A-Hansen Point (West side of river; B-across from Hansen's Point (East side of river); C-Tule Point (near mouth of Black Slough).

3/ Average of two drifts in the same index area.

4/ Average of three drifts in the same index area.

5/ Average of four drifts in the same index area.

6/ Average of five drifts in the same index area.

Table 10. Daily king salmon catch per unit of effort in subsistence nets at Kanakanak Beach, Scandanavian Beach and Lewis Point, Nushagak District, 1986.

			Catch Per Unit of Effort 3/					
Wind 2/			Kanakanak Beach		Scandanavian Beach		Lewis Point	
Date 1/	Direction	Knots	CPUE	Effort 4/	CPUE	Effort 4/	CPUE	Effort 5/
5/31			0	3				
6/ 1	S	Windy	0	6				
2			0	17	0	9		
3	N	10-15	0	21	0	10		
4	NNE	5-10	0.63	20				
4	E	0- 5	0.07	20				
5	SE-E	0- 5	0.07	20				
6	NNE	10-20	0	20				
7	NE	10-15	0.05	20	0.10	9	0	1
8	NE	15-25	0	22			0	3
8	SE	5-15	0	22			0	3
9	SE	0- 5	0	23	0	4	0	4
9	E	15	0	19			0	4
10		Calm	0	23	0	4	0	4
10	E	15	0	23			0	0
11	ENE	10-15	0	24			0	4
11	NE	25-30	0.29	23			0	0
12	NE	20-30	2.17	23	4.33	9	9.0	6
12	NE	10	0.28	23	1.00	7	5.0	1
13	NE	10-15	0.07	23			0.57	7
13	SW	10-15	0	23			0.67	3
14		Calm	0	24	0	11	0	8
14		Calm	0	24				
15	SSE	5-10	0.08	23	0	11	0	4
15							0.25	8
16		Calm	0	20	0	6	0	6
16	SSE	10-15	0	22			0	8
17	SSW	10-15	0.07	14	0	7	0	9
17								
18	SSW	5-10	18.00	5	10.00	2	0.12	8
18	S	5-10	38.00	15	65.00	7	3.00	9
19	E	0- 5	2.00	15	10.00	1	7.87	8
19							3.33	6
20	NNE	10-15	0.08	13	0.40	6	2.00	5
20							0.14	7
21	SSW	5-10	0.33	13	1.00	1	0.83	6

(continued)

Table 10. (continued)

			Catch Per Unit of Effort 3/					
Wind 2/			Kanakanak Beach		Scandanavian Beach		Lewis Point	
Date 1/	Direction	Knots	CPUE	Effort 4/	CPUE	Effort 4/	CPUE	Effort 5/
6/21							0.17	6
22							0.16	6
22							0	6
23	SE	10-15	26.00	15	10.30	8	0	6
23							0	6
24							15.83	6
24							12.00	6
25	SSW	10-15	2.00	2	9.10	4	26.00	2
25	SE	0-10	5.10	12	11.00	7	0	0
26							6.00	2
26							0	1
27	NE	0- 5	0	6			8.50	2
27					2.50	4	0	1
28							1.00	2
29							5.00	1
29							0	0
30							0.50	2

Season Average CPUE and Effort

- 1/ Catches recorded at low water when nets are picked.
- 2/ As recorded on Kananak Beach at time of survey.
- 3/ Average number of kings per (unpicked) net (CPUE) at Kananak Beach, and Scandanavian Beach in Dillingham, and at the lower fish camp site at Lewis Point on Nushagak River.
- 4/ Total subsistence nets fishing on Kananak and Scandanavian Beaches.
- 5/ Subsistence nets (index and non-index) monitored for CPUE.

Table 11. Emergency order commercial salmon fishing periods, Commissioner's announcements, and general announcements, by district, Bristol Bay, 1986.

I. Emergency Orders 1/

Number	Date and Time				Hours/Days Open
NAKNEK-KVICHAK DISTRICT					
Kvichak Section Only					
AKN 27	July 16	8:00 p.m.	to July 28	9:00 a.m.	11 days, 13 hrs. 3/
AKN 28 (Supersedes AKN 27)	July 21	9:00 a.m.	to July 26	9:00 a.m.	5 days
Naknek Section Only (Drift net area reduced)					
AKN 06	July 3	10:00 a.m.	to July 3	10:00 p.m.	12 hrs.
AKN 07	July 3	10:00 p.m.	to July 4	6:00 p.m.	20 hrs.
AKN 09	July 4	6:00 p.m.	to July 5	6:00 p.m.	24 hrs.
AKN 10	July 5	6:00 p.m.	to July 6	8:00 p.m.	26 hrs.
AKN 16	July 9	1:00 p.m.	to July 10	1:00 a.m.	12 hrs. 3/
Naknek Section Only (Set net area reduced)					
AKN 17	July 10	1:00 a.m.	to July 10	1:00 p.m.	12 hrs. 3/12/
AKN 20	July 10	1:00 p.m.	to July 11	1:00 a.m.	12 hrs. 3/
AKN 21	July 11	1:00 a.m.	to July 12	1:00 a.m.	24 hrs. 3/
AKN 22	July 12	1:00 a.m.	to July 13	2:00 a.m.	25 hrs. 3/
Naknek Section (Special Harvest Area)					
AKN 16	July 9	2:00 p.m.	to July 9	8:00 p.m.	6 hrs.
AKN 17	July 10	5:00 a.m.	to July 10	11:00 a.m.	6 hrs.
AKN 20	July 10	11:00 a.m.	to July 11	10:00 p.m.	35 hrs.
AKN 22	July 11	10:00 p.m.	to July 15	8:00 a.m.	3 days, 10 hrs.
AKN 27	July 16	8:00 p.m.	to July 19	9:00 a.m.	2 days, 13 hrs.

(continued)

Table 11. (continued)

I. Emergency Orders 1/						
Number		Date and Time			Hours/Days Open	
<u>EGEGIK DISTRICT</u>						
AKN 01	June 3	9:00 a.m.	to	June 23	9:00 a.m.	- 6/
AKN 02	June 3	9:00 a.m.	to	Sep. 30	12:00 MN	2/
AKN 04	June 27	4:00 p.m.	to	June 28	3:00 a.m.	11 hrs.
AKN 05	July 2	7:00 a.m.	to	July 2	7:00 p.m.	12 hrs.
AKN 06	July 3	8:00 a.m.	to	July 3	8:00 p.m.	12 hrs.
AKN 08	July 5	9:00 a.m.	to	July 5	9:00 p.m.	12 hrs.
AKN 11	July 6	12:00 MN	to	July 7	12:00 NOON	12 hrs.
AKN 13	July 9	1:00 a.m.	to	July 9	1:00 p.m.	12 hrs.
AKN 15	July 8	12:00 MN	to	July 9	1:00 p.m.	13 hrs.
(Supersedes AKN 13)						
AKN 18	July 11	2:00 a.m.	to	July 11	2:00 p.m.	12 hrs.
AKN 23	July 12	4:00 p.m.	to	July 13	4:00 p.m.	24 hrs.
AKN 24	July 13	4:00 p.m.	to	July 14	4:00 p.m.	24 hrs.
AKN 25	July 14	4:00 p.m.	to	July 15	5:00 p.m.	25 hrs.
AKN 29	Aug. 12	12:00 NOON	to	Sep. 30	12:00 MN	48 days, 12 hrs. 6/
<u>UGASHIK DISTRICT</u>						
AKN 03	June 16	9:00 a.m.	to	Sep. 30	12:00 MN	- 11/
AKN 06	July 3	8:00 a.m.	to	July 3	8:00 p.m.	12 hrs.
AKN 08	July 5	9:00 a.m.	to	July 5	9:00 p.m.	12 hrs.
AKN 12	July 6	10:00 p.m.	to	July 7	12:00 NOON	14 hrs.
AKN 14	July 8	11:00 p.m.	to	July 9	1:00 p.m.	14 hrs.
AKN 19	July 11	1:00 a.m.	to	July 11	2:00 p.m.	13 hrs.
AKN 23	July 12	4:00 p.m.	to	July 13	4:00 p.m.	24 hrs.
AKN 24	July 13	4:00 p.m.	to	July 14	4:00 p.m.	24 hrs.
AKN 25	July 14	4:00 p.m.	to	July 15	5:00 p.m.	25 hrs.
AKN 26	July 15	5:00 p.m.	to	July 19	8:00 a.m.	3 days, 16 hrs.
AKN 29	Aug. 12	12:00 NOON	to	Sep. 30	12:00 MN	48 days, 12 hrs. 6/
AKN 30	Aug. 29	9:00 a.m.	to	Sep. 30	12:00 MN	32 days, 15 hrs. 5/

(continued)

Table 11. (continued)

I. Emergency Orders 1/						
Number	Date and Time				Hours/Day Open	
<u>NUSHAGAK DISTRICT</u>						
DLG 01	June 7	9:00 a.m.	to July 17	9:00 a.m.	-	7/
DLG 02	June 12	5:00 a.m.	to June 12	5:00 p.m.	12 hrs.	
DLG 03	June 19	10:00 a.m.	to June 19	10:00 p.m.	12 hrs.	
DLG 04	June 30	9:00 p.m.	to July 1	9:00 a.m.	12 hrs.	8/
DLG 06	July 3	10:00 a.m.	to July 3	10:00 p.m.	12 hrs.	8/
DLG 11	July 11	4:00 a.m.	to July 11	4:00 p.m.	12 hrs.	
DLG 12	July 11	4:00 p.m.	to July 12	4:00 p.m.	24 hrs.	
DLG 13	July 12	4:00 p.m.	to July 13	6:00 p.m.	26 hrs.	
DLG 14	July 13	6:00 p.m.	to July 14	7:00 p.m.	25 hrs.	
DLG 16	July 14	7:00 p.m.	to July 15	7:00 p.m.	24 hrs.	
DLG 17	July 15	7:00 p.m.	to July 17	9:00 a.m.	38 hrs.	
DLG 18	July 19	9:00 a.m.	to July 21	9:00 a.m.	48 hrs.	
DLG 20	Aug. 1	9:00 a.m.	to Aug. 2	9:00 a.m.	24 hrs.	9/
DLG 21	Aug. 6	9:00 a.m.	to Sep. 30	12:00 MN	-	5/
<u>Igushik Section Only</u>						
DLG 07	July 9	4:00 a.m.	to July 9	4:00 p.m.	12 hrs.	
DLG 08	July 9	4:00 p.m.	to July 10	4:00 p.m.	24 hrs.	
DLG 10	July 10	4:00 p.m.	to July 11	4:00 p.m.	24 hrs.	
<u>TOGIK DISTRICT</u>						
<u>Togiak River Section Only</u>						
DLG 05	July 3	9:00 a.m.	to Oct. 1	12:00 NOON	-	10/
DLG 09	July 9	9:00 a.m.	to July 14	9:00 a.m.	5 days	5/
DLG 19	July 28	9:00 a.m.	to Aug. 4	9:00 a.m.	7 days	5/
<u>Kulukak Section Only</u>						
DLG 05	July 3	9:00 a.m.	to Oct. 1	12:00 NOON	-	10/
DLG 09	July 9	9:00 a.m.	to July 14	9:00 a.m.	5 days	5/
DLG 15	July 14	9:00 a.m.	to July 15	9:00 a.m.	24 hrs.	5/
DLG 19	July 28	9:00 a.m.	to Aug. 4	9:00 a.m.	7 days	5/

(continued)

Table 11. (continued)

I. <u>Emergency Orders 1/</u>			
Number	Date and Time		Hours/Days Open
<u>TOGLAK DISTRICT (continued)</u>			
<u>Osviak Section Only</u>			
DLG 22	Aug. 19	9:00 a.m. to Oct. 1 12:00 NOON	- 14/
<u>Matogak Section Only</u>			
DLG 22	Aug. 19	9:00 a.m. to Oct. 1 12:00 NOON	- 14/
<u>Cape Peirce Section Only</u>			
DLG 22	Aug. 19	9:00 a.m. to Oct. 1 12:00 NOON	- 14/
<hr/>			
<hr/>			
II. <u>Commissioner's Announcements 1/</u>			
Number/Date	Description		
AKN 01-86 July 15 12:00 NOON	Waives the 48 hour waiting period for district transfers, changing type of gear fished, and relocation of set net sites in Egegik and Ugashik districts as required under 5 AAC 06.370.		
			(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
AKN 01 June 18 11:30 a.m.	This is the Alaska Department of Fish and Game in King Salmon with an update on the salmon fishery. The average catch per delivery for June 17 was 43 fish in the Naknek-Kvichak, 59 fish in the Egegik, and 99 fish in the Ugashik district. Effort registered for the various districts are 314 in Naknek-Kvichak, 487 in Egegik, 269 in Ugashik, 272 in Nushagak, and 64 in Togiak. The Naknek-Kvichak and Ugashik districts are open until 9:00 a.m. Saturday morning and the Egegik district is open until 9:00 a.m. Friday morning. The Nushagak district is closed at this time.
AKN 02 June 20 8:30 a.m.	This is the Alaska Department of Fish and Game in King Salmon with an update on the salmon fishery as of 8:30 a.m., June 20. Estimated sockeye catches through June 18 are 17,000 in the Naknek-Kvichak, 44,000 in Egegik, and 26,000 in Ugashik. Effort levels are 349 in the Naknek-Kvichak, 507 in Egegik, 300 in Ugashik, 301 in Nushagak, and 66 in Togiak. The Nushagak district finished a 12 hour period last night at 10:00 p.m. and is now closed. Egegik closes at 9:00 a.m. today and the Naknek-Kvichak and Ugashik districts close at 9:00 a.m. Saturday.
AKN 03 June 22 10:00 a.m.	This is the Alaska Department of Fish and Game in King Salmon with an update on the salmon fishery. Cumulative catches to date are 27,000 reds in the Naknek-Kvichak district, 85,000 in Egegik, 50,000 in Ugashik, 3,000 in Nushagak, and 2,000 in Togiak for a total catch of 167,000. The king catch in the Nushagak district is 35,000. Very little sockeye escapement has occurred in any river to date and the king escapement in Nushagak is estimated to be less than 10,000. Effort levels as of midnight on June 23 are 540 in Egegik, 293 in Naknek-Kvichak, 276 in Nushagak, 64 in Togiak, and 428 in Ugashik.

(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
AKN 04 June 22 3:00 p.m.	<p>This is the Alaska Department of Fish and Game in King Salmon with an informational announcement for fishermen. Buoys were placed in the Ugashik District on June 21. The following are the Loran coordinates, from north to south, of the eight buoys placed on the west Ugashik line:</p> <p style="margin-left: 40px;">Buoy #1 32782.0 & 45150.2 Buoy #2 32795.2 & 45158.7 Buoy #3 32808.8 & 45168.2 Buoy #4 32822.2 & 45177.7 Buoy #5 32835.5 & 45187.0 Buoy #6 32849.0 & 45196.2 Buoy #7 32861.8 & 45205.0 Buoy #8 32875.1 & 45214.1</p> <p>Buoys #1,3,5,6, and 7 are lighted. Buoys were also placed at the north and south ends of the Egegik district. The Loran coordinates of those buoys are:</p> <p style="margin-left: 40px;">North Egegik 32570.0 & 45140.2 South Egegik 32631.0 & 45140.2</p> <p>The Johnson Hill pivot buoy was also placed and its Loran coordinates are: 32430.2 & 45070.3.</p>
AKN 05 June 23 10:00 a.m.	<p>This is the Alaska Department of Fish and Game in King Salmon with an update on the salmon run as of 10:00 a.m., June 23. Cumulative catches to date are 85,000 in Egegik, 50,000 in Ugashik, 28,000 in Naknek-Kvichak, 3,000 in Nushagak, and 2,000 in Togiak for a total of 169,000 total sockeye. The Nushagak king catch stands at 35,000. Escapements have been very minimal in all rivers to date and no openings are planned at this time. Effort levels 48 hours from now will be 530 in Egegik, 295 in Naknek-Kvichak, 442 in Ugashik, 283 in Nushagak, and 60 in Togiak. Further updates will be forthcoming each morning.</p>

(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
AKN 06 June 24 10:00 a.m.	This is the Department of Fish and Game in King Salmon with an update on the salmon fishery as of 10:00 a.m., June 24. All districts with the exception of Togiak remain closed at this time. Escapement monitoring with counting towers and inside river test fishing continue but no appreciable escapement has occurred. Further updates will be reported when significant information becomes available.
AKN 07 June 25 2:15 p.m.	This is the Alaska Department of Fish and Game in King Salmon with an update on the salmon fishery, as of noon, June 25. District test fishing was conducted in both the Egegik and Naknek-Kvichak districts yesterday. Catches were low and it appears that very little buildup has taken place. Escapements are minimal in all systems. Inside test fish projects have shown little to no movement up the rivers. The inside Egegik project has caught a few fish on the small high tides but nothing on the large highs. Kvichak inside test has caught zero to date and Ugashik inside test has not caught over two fish on any drift. District test boats will fish today in the Naknek-Kvichak and Ugashik districts however results will not be available until tomorrow. District registration stands at 539 in Egegik, 309 in Naknek-Kvichak, 306 in Nushagak, 57 in Togiak, and 407 in Ugashik.
AKN 08 June 26 1:15 p.m.	This is the Alaska Department of Fish and Game with an update on the salmon fishery as of noon, June 26. Egegik fishermen should stand by at 3:00 p.m. for an announcement on fishing time. A district test boat fished the Naknek section last night. A few fish were caught off the mouth of the Naknek River, but indices were not high. The Naknek River escapement is just over a thousand and fish are not moving into the river in any numbers. The Kvichak inside test fishery shows very little escapement is occurring in that system. There is no planned announcement at

(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
AKN 08 (cont.)	this time in the Naknek-Kvichak district. Outside test fishing in the Ugashik district yesterday showed no movement into the district as yet. Inside test fish indices upriver also indicate little movement. Effort levels effective 8:00 a.m., June 28 are 544 in Egegik, 317 in Naknek-Kvichak, 316 in Nushagak, 66 in Togiak, and 397 in Ugashik.
AKN 09 June 28 2:00 p.m.	This is the Alaska Department of Fish and Game in King Salmon with an informational announcement on the salmon run as of 2:00 p.m., June 28. Outside test fish results indicate scattered schools of fish within the Naknek section however no fish are moving up the river. The present escapement is 1,200. The Kvichak inside test fish program shows no significant escapement to date. No opening is planned until there is adequate early escapement in the Naknek River. The commercial fishery in the Egegik district for the 11 hour period just ended produced an estimated harvest of 200,000. Escapement is 17,000 past the tower and an additional 55,000 estimated in the river. An outside test boat will be sent out tomorrow to monitor any buildup of fish in the district. Very few fish have escaped into the Ugashik River. A district test fish boat will be fishing today however results will not be available until tomorrow morning. The False Pass fishery ended Wednesday with a sockeye catch of less than half of the quota. A total of 453,000 reds and 330,000 chums were harvested. Effort levels in Bristol Bay are not available at this time.
AKN 10 June 29 2:30 p.m.	This is the Alaska Department of Fish and Game in King Salmon with an informational announcement on the salmon run as of 1:00 p.m., June 29. The Naknek River tower count is just over 2,000 fish with very little in the river. The schools of fish that are around are not migrating up the river but are milling in and out of the district and river mouths. A district test fish boat fished last night. Except for a few fish near the mouth of the

(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
AKN 10 (cont.)	<p>Naknek River, the district is relatively empty with scattered schools in a few areas. The Kvichak River escapement has yet to materialize and the inside test project indicates very little escapement. No fishing is anticipated at this time. A district test boat at Egegik showed a few fish moving back into the district but not near enough to contemplate an opening. Inside test fish drifts are still low and very few fish are entering the river. Escapement past the tower is 27,000 with an additional 46,000 estimated in the river. The test boat at Ugashik also caught a few fish in the district and nothing is entering the river. There are no fishing announcements planned for anywhere at this time. Effort levels that would be effective midnight, July 1 are 566 in Egegik, 363 in Naknek-Kvichak, 343 in Nushagak, 69 in Togiak, and 348 in Ugashik.</p>
AKN 11 June 30 2:30 p.m.	<p>This is the Department of Fish and Game in King Salmon with an informational announcement on the salmon run as of 2:00 p.m., June 30. The Naknek River escapement through 10:00 a.m. this morning was 18,000 with very little passage at the present. The Kvichak escapement is virtually nil at this time. An outside test boat had small catches throughout the Naknek section and down to Low Point. An aerial survey yesterday down the coast to Middle Bluff showed two areas of fish, neither of which looked very large. A very conservative approach will be taken considering present run strength and the probability that the run is late and/or less than forecast. Inside test fish indices in the Egegik River have gradually increased since the last opening, but are still below those observed before that opening. District test fish results have shown no large buildup of fish although some are scattered throughout the district. Escapement past the tower stands at 37,000 with an additional 40,000 estimated in the river. Ugashik district test fishing has shown some fish in several areas of the district, but, like in Egegik, not in significant numbers. Very little has moved into the river. No openings are planned at this time. Monitoring in all districts by inside and outside test boats and aerial surveys will continue in order to gauge run strength. Effort levels effective at 11:00 p.m., July 2 will be 566 in Egegik, 377 in Naknek-Kvichak, 376 in Nushagak, 69 in Togiak, and 308 in Ugashik.</p>

(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
AKN 12 July 1 3:00 p.m.	This is the Alaska Department of Fish and Game in King Salmon with an informational announcement on the status of the salmon run as of 3:30 p.m., July 1. Fish have entered the lower Naknek River on the last tide and appear to be moving upriver. The number of fish entering the river has not yet been determined, but aerial surveys are being conducted to assess the situation. No concentrations of fish have been located within the Naknek-Kvichak district by the test fish boat, except for the group of fish at the Naknek River mouth. A total of 17,800 sockeye have been counted past the tower since the start of the season. No information is available from the river test fish boat in the Kvichak River, and no fish have yet moved past the tower. No concentrations of fish have been located within Egegik district by the test fish boat, although good test fish indices have been obtained to the north of the district. Some fish have been moving upriver past the river test fishing site, and good indices were obtained on the last tide. About 42,500 sockeye have been counted past the tower this season. Ugashik district continues to remain quiet. Test fish catches within the district have been spotty and no fish are moving upriver past the river test fish site. No sockeye have been counted past the tower yet this season. Preliminary catch reports from Nushagak district for the last opening indicate a high proportion of chum salmon within catches. Estimated catch is about 150,000 sockeye, 150,000 chum, and 10,000 kings.
AKN 13 July 2 2:30 p.m.	This is the Alaska Department of Fish and Game in King Salmon with an informational announcement on the status of the salmon run as of 2:00 p.m., July 2. The escapement past Naknek tower as of 10:00 a.m. this morning was 90,000 fish with a high hourly passage rate. There are also high numbers of fish in the entire river. Kvichak River fish have finally begun to move into the lower river area. Scale samples have been collected from the mouth of the river and will be analyzed immediately. We still have yet to see Kvichak fish actually moving up the river. Fishermen are advised to listen at our regularly scheduled announce-

(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
AKN 13 (continued)	<p>ment times for any openings. The Egegik tower escapement through 10:00 this morning was 67,000 with an additional 87,000 fish estimated in the river. Aerial surveys of the district showed several areas of fish concentrations. Fishing began in Egegik at 7:00 a.m. this morning for a 12 hour period. No fish have moved into Ugashik River as yet but outside boats have picked up fish near the outer district boundaries. There is no announcement for Ugashik at this time. Fish have also begun to move into the Wood and Nuyakuk rivers in good numbers. An outside test boat is fishing the Nushagak district at this time. We are also looking at Egegik catch samples for interception of Kvichak fish. Additional scale analysis equipment has been provided by a special appropriation from the Governor's office. Because of the delayed entrance of fish into the rivers, fishermen are advised that openings may be announced with less than the normal 12 hours lead time.</p>
<p>AKN 14 July 3 12:00 NOON</p>	<p>This is the Alaska Department of Fish and Game in King Salmon with an informational announcement on the status of the salmon run as of noon, July 3. Fishing has been allowed in the following areas:</p> <p style="padding-left: 40px;">Naknek Section of the Naknek-Kvichak District from 10:00 a.m. to 10:00 p.m., July 3, with a change in the northern section boundary reducing the area available to the drift fleet.</p> <p style="padding-left: 40px;">Egegik district from 8:00 a.m. to 8:00 p.m., July 3.</p> <p style="padding-left: 40px;">Ugashik district from 8:00 a.m. to 8:00 p.m., July 3.</p> <p style="padding-left: 40px;">Nushagak district from 10:00 a.m. to 10:00 p.m., July 3 with the red salmon line in effect.</p> <p>Effort levels are 377 in the Naknek-Kvichak, 561 in Egegik, 310 in Ugashik, 404 in Nushagak, and 73 in Togiak. Total spawning escapement into the Naknek River is about 550,000 as of 10:00 a.m., July 3. Total spawning escapement into the Kvichak River is only 500 as of 10:00 a.m., July 3, but fish are beginning to move past the river test fishing site below Levelock. Total run to date into the district is about 600,000. Total spawning</p>

(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
AKN 14 (continued)	<p>escapement into the Egegik River is about 100,000 as of 10:00 a.m., July 3. As many as 400,000 fish are estimated to be in the river below the tower, based on test fish and aerial survey data. An estimated 750,000 sockeye were caught in the last commercial opening. Total run to date is about 1.5 million. No fish have moved past the tower on the Ugashik River, but some fish are passing the river test fishing site and fair catches were made by the district test fishing boat prior to today's opening. Total run to date is about 60,000. Spawning escapement into Wood River was about 21,000 as of 6:00 a.m., July 3. Spawning escapement into the Igushik River was about 43,000 as of 6:00 a.m., July 3. A fair number of fish are in the Igushik River below the tower as well. Total run into the Nushagak district to date is about 350,000. Total run of sockeye salmon into Bristol Bay as of July 2 was about 2.5 million. The run appears to have started several days late, but it is still too early to determine what the final run size will be.</p>
AKN 15 July 5 9:00 a.m.	<p>The Naknek Personal Use Fishery is now open. Permits are available in the King Salmon Fish and Game office for Alaskan residents wishing to take up to 75 sockeye salmon with 10 fathoms of set gill net in the Naknek River. The fishery is open during open subsistence fishing periods. Permit applicants need to have their 1986 sport fishing license with them when applying for the personal use fishery permit.</p>
AKN 16 July 6 4:30 p.m.	<p>This is the Alaska Department of Fish and Game in King Salmon with an informational announcement on the status of the Naknek-Kvichak sockeye run. The Naknek River escapement through 2:00 p.m. was 903,000 with an hourly passage rate of less than 1,000. The Kvichak escapement through 2:00 p.m. was 200,000 with less than 100,000 in the river. It is apparent that the Kvichak run is very late, very weak, or both. Under normal run timing conditions we would expect to have seen more than 1.3 million fish past the Kvichak tower as of this date. Test boats will be sent out tomorrow to monitor the district and areas to the south.</p>

(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
AKN 17 July 7 9:00 p.m.	This is the Department of Fish and Game in King Salmon with an informational announcement on the salmon run to Bristol Bay as of 9:00 p.m., July 7. The total Naknek-Kvichak catch to date is 994,000. Escapements through 6:00 p.m. this evening are 928,000 at Naknek and less than 300,000 in the Kvichak. There are two test boats presently fishing the district and below the district. The Egegik escapement through 6:00 p.m. was 642,000 with an additional 200,000 in the river. The catch through the period that ended today is estimated at 2,400,000. The Ugashik escapement is estimated to be between 300 - 400,000. The catch is approaching two million. The Nushagak catch is presently 979,000. Wood River escapement through 6:00 p.m. was 161,000. The Nuyakuk escapement is estimated at 120,000 and Igushik at 120,000.
AKN 18 July 8 12:00 NOON	This is the Department of Fish and Game in King Salmon with an informational announcement on the status of the Naknek-Kvichak district as of noon, July 8. The Kvichak River tower escapement through 10:00 a.m. this morning was 221,000. There are very few fish in the river below. The Naknek tower escapement through 10:00 a.m. was 968,000. Outside test fish boats fished within and below the district on last night's tide. No significant catches were made although a few fish were caught on the west side of the Kvichak section. Due to the extremely poor run to the Kvichak system, any interception at this point would be intolerable. If and when the Naknek escapement reaches 1.2 million, fishing time in the river would depend on the strength of the Naknek run at that time.
AKN 19 July 9 12:00 NOON	Because of serious concern by Kvichak fishermen over interception of red salmon bound for the Kvichak River, the Alaska Department of Fish and Game is conducting a special project to identify

(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
AKN 19 (continued)	<p>presence of Kvichak River reds in other areas. Initial studies were conducted on catches made by the drift boats in the modified Naknek Section and on catches made by set nets on north Naknek beaches. We found that catches made by the drift fleet were composed of 80% Naknek fish. Setnet catches were also about 80% Naknek fish with a higher proportion of Naknek fish being taken in nets south of Peterson Point and a lower proportion being taken in set nets between Peterson Point and Libbyville. With special equipment provided through the Governor's Office, we were also able to determine interception levels in the Egegik district. Based on one age class, we found that 98% of the overall catch in the Egegik district were Egegik fish and 2% were fish headed to the Naknek-Kvichak district. Interception estimates are being made by two methods, age class comparisons and by scale pattern analysis. The scale pattern analysis method is a relatively sophisticated technique requiring special computer equipment. The methodology requires us to find special characteristics on salmon scales that associate a salmon with a particular river. Then we collect samples from commercial catches and match the scales against known scale patterns for each contributing river. Accuracy of the method for the Egegik analysis was 90% and for the Naknek-Kvichak analysis was 77%. We are continuing to collect scale samples from Naknek and Egegik catches for additional inseason and postseason analysis.</p>
AKN 20 July 15 6:00 p.m.	<p>This is the Alaska Department of Fish and Game in King Salmon with a general announcement on the status of the Kvichak and Naknek River salmon runs. The present Kvichak escapement is 881,000 with another 200,000 in the river. Inside test fish indices have been down the last three tides. The Naknek escapement is 1,838,000 at present with an hourly passage rate of 500 fish. The Naknek River Special Harvest Area will close on schedule at 8:00 a.m. tomorrow, July 15 in order to accomodate the subsistence fishery and to allow some late fish to escape. The Special Harvest Area will probably be opened after the one day subsistence fishery. At the present, outside beaches will remain closed. The Kvichak section closure will remain in effect until at least July 28.</p>

(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
DLG 01 June 6 12:00 NOON	<p>This is the ADF&G with an informational announcement concerning the Nushagak District. The Nushagak District shall be closed to the harvest of salmon from 9:00 a.m., Saturday, June 7th until further notice. The catch through June 5th stands at approximately 4,500 kings, very similar to the 4,000 caught in 1985 for the same date. Both years are well behind the average catch of 7,300 for this date. Daily monitoring of subsistence catches on local beaches confirm that a very limited king salmon escapement has passed the commercial fishery.</p> <p>King escapement will be monitored on a daily basis using subsistence catches in Dillingham, at Lewis Point and by our sonar camp at Portage Creek. Future fishing time is probable next week but will be dependent on escapement trends and weather. When the fishery does re-open, the red salmon line will be in effect.</p>
DLG 02 June 13 3:00 p.m.	<p>This is the ADF&G with an update on the status of the Nushagak king fishery. This last fishing period produced a catch of 21,500 kings which brings the total harvest to about 30,000 kings, near the long-term average for this date. Estimated escapement is approximately 10,000 kings.</p> <p>The Nushagak fishery is closed now and further fishing time will be dependent upon increased escapement, based on data from the subsistence nets at Kanakanak Beach and Lewis Point as well as data from the sonar site at Portage Creek.</p>
DLG 03 June 16 10:00 a.m.	<p>This is the ADF&G with a brief status report on the Nushagak District. At the present time the Nushagak District remains closed and is holding for king salmon escapement. The king harvest to date is approximately 30,000. The escapement at this time is considered fair and just over 1,000 past the counter at Portage Creek.</p> <p>At this point we are still optimistic about the strength of the king run but we need to see a good showing of escapement evidenced by a strong catch in the subsistence nets before we go fishing again. We will be into the red salmon management soon and there will not be much we can do to get the kings through at that time so this is the time to get some escapement.</p>

(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
DLG 04 June 23 10:00 a.m.	This is the ADF&G with a brief status report on the Nushagak District. We are closed at this time for necessary king salmon escapement. The total count past the Portage Creek sonar site is 5,900 as of 8:00 a.m. this morning, the majority of which are kings. The strong catches of kings in the subsistence nets on June 18th did not result in a major showing upriver. Very likely the fish are simply holding and not going on up. However, there are signs of red salmon starting to show now with reports of finners at several locations, so it is critical that we get a good escapement of kings soon because we will have to shift to red salmon management at some point. A gale warning is forecast for area 6A this evening and we hope that it will push the fish in. We will be carefully watching the indicators and hope we can fish again shortly.
DLG 05 June 24 10:00 a.m.	<p>This is the ADF&G with a status report on the Nushagak District. Subsistence catches on kings have improved again at Kanakanak and Scandanavian beaches. Kanakanak nets averaged 26 kings for 11 nets compared to 38 per net on the good catches on June 18. Scandanavian beach averaged 10 kings per net for 4 nets and on the 18th they averaged 65 per net. There are some kings hitting at Lewis Point this morning, but the volume doesn't appear to be large. Sonar counts of all salmon species, at Portage Creek, total 6,600 through this morning, and reports from upriver indicate few kings at Elwok so far. King catches at Port Heiden have been poor and the king runs on the north and south peninsula are generally showing low catches.</p> <p>All of these indicators dictate caution in management of the Nushagak king run. The season is still early for reds and chums and the sockeye escapement at Wood River remains at 0 to date. Few small fish have passed Portage Creek, so reports of fish starting to move are encouraging.</p>
DLG 06 June 26 10:00 a.m.	This is the ADF&G with a status report concerning the Nushagak District. At this time we are still holding for king salmon escapement in the Nushagak. We have 4,400 kings past the Portage Creek sonar site as of this morning. The total counts doubled yesterday, but they were mostly chums. The Lewis Point subsistence catches indicate a king escapement of about 21,000. If those fish pass the counters, the total

(continued)

Appendix Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
DLG 06 (continued)	<p>escapement will still be below the average of 29,000 for this date. Weak king runs at Port Heiden and in the Kuskokwim River may also indicate the Nushagak king run to be below forecast. Clearly, when the sockeye escapement begins to build rapidly we will be fishing, but so far the fish appear to be holding in all districts in Bristol Bay.</p> <p>We have a test boat out at this time in Nushagak, not so much to measure abundance as we know that there are fish building up in the district, but to compare the age composition with the forecast, check the chum percent and to determine when the fish are beginning to move inshore. The first five drifts caught a total of 3 reds, so things appear to be slow.</p>
DLG 07 June 28 10:00 a.m.	<p>This is the ADF&G with an update on the status of the Nushagak District. The test boat is going out today but catches in the inshore area have been low to date. There was a slight improvement in test boat catches yesterday and the chum percent dropped a couple of points but there was no significant change from the previous trips. The Wood River tower escapement yesterday was 648 fish and the total stands at 2,280 through midnight. The morning count at Wood River was 248 from midnight until 6 a.m. Results from an aerial survey of the river showed no; fish on the morning's tide. Fair numbers of fish are passing the Portage Creek sonar site but the majority are chum salmon, (64% in the samples yesterday:). It appears that the fish are holding in all districts at this time and have not yet begun to push into the rivers.</p>
DLG 08 June 29 10:00 a.m.	<p>This is the ADF&G with an update on the status of the Nushagak District. The Nushagak test boat results from yesterday showed an increase in index points and a larger percentage of sockeye to chums. Catches were still spotty with some good sets and some poor sets. The boat will be going out at 1:00 p.m. today. Escapement up the Nushagak River yesterday was 95% chum salmon with no major change in sockeye or kings. Only 414 fish moved up the Wood River yesterday with the total escapement to date of about 2,700 sockeye. Igushik River escapement past the tower is still zero. Aerial surveys this morning showed some fish in the upper Igushik River, no fish in the Wood River and few fish in the Nushagak River.</p>

(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
DLG 09 July 7 12:00 NOON	This is the ADF&G with a brief informational announcement concerning the Nushagak District. As of this hour, the Wood River tower escapement is approximately 150,000 and building very slowly. A test boat is out in the district at this time and catches have been fairly low in all areas sampled. Escapement is light in the rivers at this time and the Nushagak District will remain closed until a major showing of sockeye is observed in the rivers.
DLG 10 July 8 8:00 a.m.	This is the ADF&G with a brief informational announcement concerning the Nushagak District. The Wood River tower count through 6:00 a.m. this morning stands at just over 181,000 and that includes all observations to date. With the escapement goal at 1,000,000, many more fish are needed. A test boat is going out again today and aerial surveys of the rivers will continue, but for now, the Nushagak District will remain closed.
DLG 11 July 9 9:00 a.m.	This is the ADF&G with an informational announcement concerning the Nushagak District. The Wood River tower count stands at 240,000 through 6 a.m. on July 9th and the rate remains unchanged for the past four days. The sockeye counts have been running from about 35,000 to a high of 46,000 for each 24 hour period. Test boat catches in the lower Wood River have been approximately the same for the past two days. Three aerial surveys of Wood River today indicate another 40-50,000 fish in the river. Test boat catches this morning indicated a body of fish in the area between Kanakanak, Grassy Island, and Picnic Pt., but there is no sign of improved escapement into the lower Wood River as of 5:30 p.m. 5:30 p.m. this evening. It is likely that these catches are composed of mostly Nuyakuk River fish as evidenced by the size and age composition. A test boat will go out again tomorrow morning and the staff will continue intensive aerial surveys, but only 24% of the Wood River escapement goal has been achieved at this time.
	The sockeye escapement past the sonar site at Portage Creek continues strong and as of 6 p.m., approximately 264,000 have been counted. Aerial survey results of the lower Nushagak this afternoon indicated another 70,000 fish in clear water below the sonar site, which gives a total of 334,000 or 67% of the goal, accounted for to date.

(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
DLG 11 (continued)	<p>The Igushik escapement continues to show good strength and the total past the tower through 6 p.m. stands at 84,000. Aerial surveyors today sighted another 22,000 in clear water, for a total of 106,000 or 53% of the goal in sight. The test fish site above the inside markers is indicating a total of 200,000 fish have passed the commercial fishery. Tagging this year is showing a five day interval between the test site and the tower, so roughly 5 days of fish are still in the river.</p> <p>There is still a lack of small (2-ocean) fish in the test boat catches and in the commercial catch, in the Nushagak, Kvichak and Togiak Districts. This would indicate a return less than our pre-season forecasts in those areas.</p> <p>There have been several reports of fish sightings in the Nushagak District and the staff flew two surveys today and documented fish from Ekuk to Grassy Island. We haven't given up yet, but there is little time left for a strong showing of fish at this late date.</p>
<p>1/ Prefix code on emergency orders and Commissioner's announcements and general announcements indicate where announcements originated ("AKN" for the King Salmon field office and "DLG" for the Dillingham field office).</p> <p>2/ Extended the closure beyond the normal emergency order period.</p> <p>3/ Set net gear only.</p> <p>4/ Reduced the Naknek Section north boundary to south of the southernmost point of Pederson Point dock.</p> <p>5/ Reduced the regular five-day weekly fishing schedule to four-days per week.</p> <p>6/ This emergency order established the north Egegik District boundary line by Loran C coordinates.</p> <p>7/ This emergency order established the north Ugashik District boundary line by Loran C coordinates.</p>	

(continued)

Table 11. (continued)

III. General Announcements 1/

Number/Date	Description
8/	Closed to fishing.
9/	This emergency order amended the weekly fishing schedule by advancing the period regulated by emergency order, and closed the area south of the sockeye salmon boundary line, both effective June 7, 9:00 a.m.
10/	Large mesh king salmon gill net gear prohibited.
11/	Reduced the regular five-day weekly fishing schedule to two 24 hour fishing periods per week effective August 1, 9:00 a.m.
12/	Reduced the regular 4 and 5 day weekly fishing schedule in the Togiak and Kulukak Sections of the Togiak District to three days per week from July 3 until the end of the season.
13/	Reduced the regular weekly fishing schedule by 48 hours, effective August 19 of the season.

Table 12. Daily district registration of drift gill net fishermen by district, Bristol Bay, 1986. 1/

Date	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
6/15	251	375	207	271	61	1,165
16	266	434	229	278	61	1,268
17	314	487	269	272	64	1,406
18	333	502	293	279	67	1,474
19	339	502	291	279	67	1,478
6/20	347	480	307	280	64	1,478
21	289	464	300	256	64	1,373
22	285	470	372	260	60	1,447
23	290	522	429	280	57	1,578
24	288	505	405	280	57	1,535
6/25	312	527	395	312	66	1,612
26	315	530	391	314	67	1,617
27	317	544	397	316	66	1,640
28	323	553	393	320	67	1,656
29	349	560	345	330	69	1,653
6/30	355	559	306	345	69	1,634
7/ 1	374	555	302	376	77	1,684
2	379	566	306	388	72	1,711
3	377	561	310	404	73	1,725
4	372	522	326	378	81	1,679
7/ 5	395	583	326	385	81	1,770
6	309	439	506	363	81	1,698
7	273	416	576	336	81	1,682
8	252	432	676	299	80	1,739
9	263	451	688	300	80	1,782
7/10	225	464	730	251	80	1,750
11	223	476	739	236	81	1,755
12	224	484	739	251	80	1,778
13	224	489	743	252	81	1,789
14	225	452	706	263	81	1,727
7/15	236	440	693	299	84	1,752
16	260	441	660	345	84	1,790
17	268	441	660	346	84	1,799
Mean	299	492	455	307	72	1,625

1/ Total indicates number of drift gillnet permit holders legal to fish each day in the districts (transferees not included). There were 1,805 permit holders actually registered for the season.

Table 13. Commercial salmon catch by period and species, Naknek-Kvichak District, Bristol Bay, 1986.

Period	Time	Effort 1/		Number of Fish					
		Drift	Set	Sockeye	King	Chum	Pink	Coho	Tot
6/ 2- 7	5 days				1				1
9-14	5 days		10	323	73	9			405
16	15 hrs.	93	18	2,519	368	554			3,441
17	24 hrs.	179	59	5,659	556	1,446			7,661
18	24 hrs.	191	77	7,137	325	404			7,866
19	24 hrs.	108		2,539	65	171			2,775
20	24 hrs.	103		6,919	130	522			7,571
21	9 hrs.	39		3,207	76	263			3,546
7/ 3	14 hrs.	268	206	269,824	147	2,836			272,807
4	24 hrs.	352		376,498	83	4,497			381,078
5	24 hrs.	338	252	359,369	36	3,785			363,190
6	20 hrs.	220		138,658	56	1,443			140,157
9	11 hrs.	214	223	119,180	43	755			119,978
10	24 hrs.	210	246	360,094	32	3,016	9		363,151
11	24 hrs.	209	242	454,206	48	4,314			458,568
12	24 hrs.	167	290	249,016	72	2,032			251,120
13	24 hrs.	147		165,384	60	2,655			168,099
14	24 hrs.	112	115	81,369	25	608			82,002
15	8 hrs.	47		26,261	14	289			26,564
16	4 hrs.	42		3,508		64			3,572
17	24 hrs.	106	140	61,185	33	1,166	4		62,388
18	24 hrs.	106		62,855	50	756	3		63,664
19	9 hrs.	53		26,049	18	573	4		26,644
21	15 hrs.	389	171	53,176	106	111,735	3,438	12	168,467
22	24 hrs.	107	137	22,925	137	13,306	3,065	22	39,455
23	24 hrs.	37	107	5,821	103	3,333	869	48	10,174
24	24 hrs.	73	90	8,004	54	4,658	4,407	37	17,160
25	24 hrs.	83	73	6,669	77	5,752	6,565	92	19,155
26	9 hrs.	8		1,657	303	451	1,939	6	4,356
28-8/2	5 days	47	60	9,301	422	36,265	65,414	2,199	113,601
8/ 4- 9	5 days			582	39	408	6	662	1,697
Total				2,889,894	3,552	208,066	85,723	3,078	3,190,313
Percent of District Catch				90.6	0.1	6.5	2.7	0.1	100.0

1/ Estimated fishing effort based on aerial surveys and fish ticket run.

Table 14. Commercial salmon catch by period and species, Egegik District, Bristol Bay, 1986.

Period	Time	Effort 1/		Number of Fish					
		Drift	Set	Sockeye	King	Chum	Pink	Coho	Total
6/ 9	15 hrs.			78	25	17			120
10	24 hrs.	11	42	219	31	20			270
11	24 hrs.			421	65	53			539
12	24 hrs.			793	152	88			1,033
13	9 hrs.			219	52	46			317
16	15 hrs.			13,340	260	1,012			14,612
17	24 hrs.			26,167	204	2,016			28,387
18	24 hrs.	222	130	23,220	213	1,638			25,071
19	24 hrs.			17,558	79	1,111			18,748
20	9 hrs.			14,890	68	865			15,823
22	-			155 2/					155
24	-			181 2/		4 2/			185
27	8 hrs.	500	227	44,222	81	1,490			45,793
28	3 hrs.			137,365	132	5,518			143,015
7/ 1	-			679 2/		19 2/			698
2	12 hrs.	551	231	828,784	120	11,934			840,838
3	12 hrs.	560	229	502,031	73	5,639			507,743
5	12 hrs.	449	227	565,372	62	6,657			572,091
7	12 hrs.		209	340,635	39	3,202			343,877
9	13 hrs.	370	200	630,743	36	5,648			636,427
11	12 hrs.	351	208	405,690	12	5,046			410,748
12	8 hrs.			125,726	10	2,162			127,898
13	24 hrs.			595,629	25	9,692			605,346
14	24 hrs.			167,587	15	2,935			170,537
15	24 hrs.			169,969	11	3,873			173,853
16	24 hrs.			153,891	9	4,708			158,608
17	24 hrs.			115,288	6	4,444			119,738
18	24 hrs.			45,354	5	2,028			47,387
19	9 hrs.			34,432	5	2,393			36,830
21	15 hrs.	73		13,793	11	1,296	25	24	15,149
22	24 hrs.			7,706	5	966	17	49	8,743
23	24 hrs.			4,754	11	580	9	96	5,450
24	24 hrs.			4,550	8	868	20	254	5,700
25	24 hrs.			4,025	15	1,063	205	343	5,651
26	9 hrs.			1,344	6	303	131	195	1,979

(continued)

Table 14. (continued)

Period	Time	Effort 1/		Number of Fish				Coho	Total
		Drift	Set	Sockeye	King	Chum	Pink		
7/28	15 hrs.	7		2,527		260	100	887	3,774
29	24 hrs.			2,699	4	383	295	1,053	4,434
30	24 hrs.			1,101	1	269	220	732	2,323
31	24 hrs.			931	4	203	190	712	2,040
8/ 1	24 hrs.			727	1	269	220	732	1,949
2	9 hrs.			162	1	54	24	106	347
4	15 hrs.			446	2	369	126	1,403	2,346
5	24 hrs.			540	10	911	177	2,105	3,743
6	24 hrs.			1,374	1	851	184	2,390	4,800
7	24 hrs.	10		365	6	238	212	1,685	2,506
8	24 hrs.			318	2	219	156	1,439	2,134
9	9 hrs.			52		39	36	290	417
11	15 hrs.	7	50	172	3	100	80	2,237	2,592
12	24 hrs.			152		74	60	1,994	2,280
13	24 hrs.			38	1	41	36	1,400	1,516
14	24 hrs.			59		23	17	947	1,046
15	9 hrs.			38		10	8	422	478
18	15 hrs.			80	5	44	21	2,853	3,003
19	24 hrs.			66		29	23	1,685	1,803
20	24 hrs.			46	2	26	26	1,509	1,609
21	24 hrs.			24	5	21	29	1,511	1,590
22	9 hrs.			5		5	3	263	276
25	15 hrs.	5	23	16	1	4	2	1,232	1,255
26	24 hrs.			14		2	2	489	507
27	24 hrs.			11		2	2	624	639
28	24 hrs.			5				412	417
29	9 hrs.			1				31	32
9/ 1	15 hrs.							689	689
2	24 hrs.							807	807
3	24 hrs.							442	442
4	24 hrs.							458	458
Total				5,008,779	1,895	93,781	2,656	34,500	5,141,611
Percent of District Catch				97.4	-	1.8	-	0.7	100.0

1/ Estimated fishing effort based on aerial surveys.

2/ ADF&G test fish catches.

Table 15. Commercial salmon catch by period and species, Ugashik District, Bristol Bay, 1986.

Period	Time	Effort 1/		Number of Fish					
		Drift	Set	Sockeye	King	Chum	Pink	Coho	Total
5/30	24 hrs.				6				6
6/ 2	15 hrs.	2	0		34				34
3	24 hrs.				66				66
4	24 hrs.				57				57
5	24 hrs.	10	0		97				97
6	24 hrs.				26				26
7	9 hrs.			2	120				122
9	15 hrs.				74				74
10	24 hrs.	22	4	60	185	4			249
11	24 hrs.			172	218	9			399
12	24 hrs.			6	76				82
13	24 hrs.			331	155	12			498
14	9 hrs.			281	195				476
16	15 hrs.	100		4,367	165	109			4,641
17	24 hrs.			12,963	509	373			13,845
18	24 hrs.	98	19	15,483	225	384			16,092
19	24 hrs.			12,593	238	331			13,162
20	24 hrs.			18,483	112	527			19,122
21	9 hrs.			25,828	109	541			26,478
26	-			10 2/					10
29	-			233 2/	1 2/	21 2/			255
7/ 1	-			639 2/		29 2/			668
3	12 hrs.	316	94	764,673	24	5,535			770,232
5	12 hrs.	320	95	562,396	39	8,667			571,102
6-7	14 hrs.		96	551,443	34	5,912			557,389
8-9	14 hrs.	643	93	713,688	17	6,927			720,632
11	13 hrs.	729	82	660,533	9	7,094			667,636
12	8 hrs.			17,290	2	238			17,530
13	24 hrs.			676,583	18	9,824			686,425
14	24 hrs.			203,264	32	3,574			206,870
15	24 hrs.			196,402	20	5,539			201,961
16	24 hrs.			236,910	14	9,000			245,924
17	24 hrs.			98,430	35	5,574	15		104,054
18	24 hrs.			68,832	21	5,764			74,617
19	9 hrs.			18,971		1,826			20,797
21	15 hrs.	318		30,138	15	6,551	1	21	36,726
22	24 hrs.			20,708	11	5,773	1	13	26,506
23	24 hrs.			3,150		938		2	4,090

(continued)

Table 15. (continued)

Period	Time	Effort 1/		Number of Fish					Total
		Drift	Set	Sockeye	King	Chum	Pink	Coho	
7/24	24 hrs.			1,639	3	488		1	2,131
25	24 hrs.			2,981	5	829		2	3,817
26	9 hrs.			272		77			349
28	15 hrs.	11		233		11		8	252
29	24 hrs.			735	1	63	4	54	857
30	24 hrs.			610		75	2	73	760
31	24 hrs.			466	1	42		51	560
8/ 1	24 hrs.			341		25		20	386
2	9 hrs.			33					33
4	15 hrs.			51				4	55
5	24 hrs.			157	1	91		100	349
6	24 hrs.			242		82		125	449
7	24 hrs.			1,738	2	1,028	9	762	3,539
8	24 hrs.			1,176	1	1,184	35	1,033	3,429
9	9 hrs.			370		431		352	1,153
11	15 hrs.	24	30	735		902		1,629	3,266
12	24 hrs.			626	1	873	13	1,391	2,984
13	24 hrs.			278		611		1,377	2,266
14	24 hrs.			76		123		250	449
15	9 hrs.			100		157		397	654
18	15 hrs.			92	1	180		1,454	1,727
19	24 hrs.			176	2	208	12	2,255	2,653
20	24 hrs.			126		120	1	2,410	2,657
21	24 hrs.			134		65	4	2,503	2,706
22	9 hrs.			17		12	2	563	594
25	15 hrs.	5	30	34		25		1,894	1,953
26	24 hrs.			110		3	2	2,124	2,239
27	24 hrs.			70		1		2,364	2,435
28	24 hrs.			22				1,914	1,936
29	9 hrs.							416	416
Total				4,928,502	2,997	98,782	101	25,562	5,055,924
Percent of District Catch				97.5	0.1	1.9	-	0.5	100.0

1/ Estimated fishing effort based on aerial surveys.

2/ ADF&G test fish catches.

able 16. Commercial salmon catch by period and species, Nushagak District, Bristol Bay, 1986.

Period	Time	Effort 1/		Number of Fish					
		Drift	Set	Sockeye	King	Chum	Pink	Coho	Total
5/27	24 hrs.				6				6
28	24 hrs.				7				7
29	24 hrs.				63				63
30	24 hrs.				181				181
31	9 hrs.				139				139
6/ 2	15 hrs.	50			903				903
3	24 hrs.	119			1,824	1			1,825
4	24 hrs.	79			1,082				1,082
5	24 hrs.	56			305	1			306
6	24 hrs.	113			654	2			656
7	9 hrs.			2	3,240				3,242
12	12 hrs.	258	10	35	21,077	124			21,236
19	12 hrs.	279	124	3,765	6,569	9,047			19,381
30-7/1	2/12 hrs.	380	253	208,305	14,214	201,425			423,944
3 2/	12 hrs.	353	221	693,779	9,236	108,276	1		811,292
7/ 9 3/	20 hrs.	212	66	91,008	189	3,500	1		94,698
10 3/	24 hrs.	145	66	63,692	177	3,412			67,281
11 4/	24 hrs.	237		492,965	1,528	34,641	8	1	529,143
12	24 hrs.	251		339,736	319	24,601	24	1	364,681
13	24 hrs.	255		210,209	208	14,680	974	146	226,217
14	24 hrs.	260		163,414	198	9,554	403	46	173,615
15	24 hrs.	299		122,991	146	8,410	1,247	185	132,979
16	24 hrs.			77,403	137	7,006	2,839	238	87,623
17	24 hrs.			52,242	56	4,781	3,147	296	60,522
18	24 hrs.			67,695	92	7,145	6,259	223	81,414
19	24 hrs.			59,176	86	6,558	8,501	339	74,660
20	24 hrs.			41,395	142	8,517	12,960	1,538	64,552
21	24 hrs.			27,661	170	2,205	11,615	902	42,553
22	24 hrs.			10,610	138	1,679	9,419	2,742	24,588
23	24 hrs.			5,055	97	604	6,959	1,528	14,243

(continued)

Table 16. (continued)

Period	Time	Effort 1/		Number of Fish				Coho	Total
		Drift	Set	Sockeye	King	Chum	Pink		
7/24	24 hrs.			5,662	45	702	11,831	1,604	19,844
25	24 hrs.			7,539	53	1,213	22,764	1,443	33,012
26	9 hrs.			2,077	14	221	7,309	143	9,764
28	15 hrs.			3,814	188	1,216	44,395	8,051	57,664
29	24 hrs.			2,912	97	866	47,033	6,954	57,862
30	24 hrs.			2,044	117	555	38,819	16,463	57,998
31	24 hrs.			1,088	111	598	21,860	13,283	36,940
8/ 1	9 hrs.			568	34	117	5,901	4,119	10,739
4	15 hrs.			500	7	87	10,987	2,878	14,459
5	9 hrs.			388	10	222	5,367	9,773	15,760
Total				2,757,730	63,859	461,966	280,623	72,896	3,637,074
Percent of District Catch				75.8	1.8	12.7	7.7	2.0	100.0

- 1/ Estimated fishing effort based on aerial survey counts and daily registration summaries.
- 2/ Large mesh king salmon gill net gear prohibited.
- 3/ Igushik section only; Nushagak section remains closed.
- 4/ Nushagak section open 4:00 a.m. through 12:00 midnight, Igushik section open the entire 24 hour period.

Table 17. Commercial sockeye salmon catch by period from Clarks Point, Ekuk and Igushik beaches, Nushagak District, in numbers of fish, Bristol Bay, 1986.

Period	Time	Clark's Point Beach 3/	Ekuk Beach 4/	Igushik Beach 5/
5/29	24 hrs.			
30	24 hrs.			
6/ 2	15 hrs.			
3	24 hrs.			
4	24 hrs.			
6	24 hrs.			
12	12 hrs.		3	
19	12 hrs.	13	77	907
6/30-7/1 1/	12 hrs.	4,616	13,268	2,975
7/ 3 1/	12 hrs.	3,845	32,392	32,533
9 2/	20 hrs.			28,759
10 2/	24 hrs.			21,523
11	24 hrs.	3,179	32,771	39,259
12	24 hrs.	4,848	25,593	13,242
13	24 hrs.	2,427	16,583	19,967
14	24 hrs.	1,672	26,429	8,469
15	24 hrs.	2,679	17,096	10,908
16	24 hrs.	1,105	4,163	6,674
17	24 hrs.	450	5,229	6,036
18	24 hrs.	313	7,968	4,334
19	24 hrs.	930	10,342	4,079
20	24 hrs.	583	8,379	2,667
21	24 hrs.	521	6,820	2,388
22	24 hrs.	169	2,461	604
23	24 hrs.		1,406	69
24	24 hrs.		1,517	680
25	24 hrs.		2,750	241
26	9 hrs.		723	157
28	15 hrs.		778	57
29	24 hrs.		1,252	291

(continued)

Table 17. (continued)

Period	Time	Clarks's Point Beach 3/	Ekuk Beach 4/	Igushik Beach 5/
7/30	24 hrs.		669	211
31	24 hrs.		278	144
8/ 1	9 hrs.		267	66
4	15 hrs.		54	35
5	9 hrs.		72	28
Total		27,350	291,340	207,303

- 1/ Large mesh king salmon gill net prohibited.
- 2/ Igushik section only; Nushagak section remains closed.
- 3/ Approximate fishing effort was 24 set nets.
Sockeye salmon accounted for 97.3% of the total beach catch;
catch of other species included 164 kings, 530 chums,
1 pink and 56 cohos.
- 4/ Approximate fishing effort was 90 set nets.
Sockeye salmon accounted for 81.5% of the total beach catch;
catch of other species included 543 kings, 8,063 chums, 33,549
pinks, and 7,573 cohos.
- 5/ Approximate fishing effort was 67 set nets and 6 drift skiffs.
Sockeye salmon accounted for 98.2% of the total beach catch;
catch of other species included 1,095 kings, 2,186 chums, 207
pinks, and 251 cohos.

Table 18. Commercial salmon catch by period and species, Togiak District, Bristol Bay, 1986.

Period 1/2/	Number of Fish					Total
	Sockeye	King	Chum	Pink	Coho	
6/10	5	78	25			108
11	16	78	62			156
12	16	29	9			54
13	1	9	1			11
16	143	349	151			643
17	305	1,015	890			2,210
18	373	706	847			1,926
19	791	703	1,608	1		3,103
20	367	202	758			1,327
21	111	62	203			376
23	2,828	1,200	2,967			6,995
24	5,172	2,096	7,755	2		15,025
25	6,008	1,194	8,719	4		15,925
26	6,451	1,085	8,502	3		16,041
27	3,288	299	2,924	1		6,512
28	463	27	287			777
30	8,916	1,744	7,843	3		18,506
7/ 1	12,337	2,219	19,188	21		33,765
2	13,476	2,073	18,713	20		34,282
3	9,110	527	11,357	17		21,011
4	2,165	74	5,651	13		7,903
5	1,635	40	3,496	13		5,184
7	18,920	786	7,914	56		27,676
8	31,862	1,015	21,626	256		54,759
9	31,362	915	25,081	251		57,609
10	2,413	70	6,813	51		9,347
11	2,625	51	7,567	111		10,354
12	257	2	428	4		691
14	29,808	274	6,227	206		36,515
15	23,864	248	19,524	341		43,977
16	23,278	237	20,202	833		44,550
17	11,355	85	10,348	339		22,127
18	1,255	6	4,280	220		5,761
19	606	3	1,344	159		2,112
21	10,214	56	10,907	1,723		22,900
22	13,440	80	10,269	3,105	1	26,895
23	10,406	78	6,004	3,311	3	19,802
24	3,333	15	2,150	1,449	1	6,948
25	796	6	1,280	505	5	2,592
26	162	1	363	123	1	650
28	852	13	992	1,082	135	3,074
29	626	6	552	675	127	1,986

(continued)

Table 18. (continued)

Period 1/2/	Number of Fish				Coho	Total
	Sockeye	King	Chum	Pink		
7/30	944	10	568	834	176	2,532
31	363	3	191	374	65	996
8/ 1	11	1	34	9	4	59
2	14		13	40	14	81
4	460	2	149	475	86	1,172
5	1,805	7	442	1,894	219	4,367
6	3,384	11	952	2,984	715	8,046
7	1,329	15	285	1,154	276	3,059
8	333	5	186	317	691	1,532
9	36		47	56	144	283
11	855	7	199	410	1,652	3,123
12	1,050	18	371	502	3,110	5,051
13	421	10	129	225	2,518	3,303
14	125	3	26	40	603	797
15	48	3	23	23	601	698
16	19		11	2	170	202
18	135	2	39	27	1,936	2,139
19	354	8	94	87	5,733	6,276
20	211	9	68	66	6,374	6,728
21	108	5	32	22	4,231	4,398
25	59	6	14	20	3,048	3,147
26	46	4	1	9	2,572	2,632
27	79	6	9	25	4,445	4,564
28	10	2	3	4	2,110	2,129
9/ 1 1/	14		2	1	619	636
2 1/	23		3	8	2,576	2,610
3 1/	18	2	2	2	1,518	1,542
4 1/	12		1	1	1,342	1,356
9 1/					224	224
10 1/					395	395
Total 2/	303,677	19,895	269,722	24,509	48,440	666,243
Percent of District Catch	45.6	3.0	40.5	3.7	7.2	100.0

1/ Only 1 company reported.

2/ See emergency order table in 1986 Bristol Bay Annual Management Report for adjustments in the regular weekly fishing schedule.

Table 19. Commercial salmon catch by period and species, Togiak Section, Togiak District, Bristol Bay, 1986.

Period 1/2/	Number of Fish					
	Sockeye	King	Chum	Pink	Coho	Total
6/10	5	78	25			108
11	16	78	62			156
12	16	29	9			54
13	1	9	1			11
16	127	333	151			611
17	224	890	666			1,780
18	223	486	346			1,055
19	467	537	1,037	1		2,042
20	259	136	395			790
23	1,399	1,050	2,007			4,456
24	2,820	1,877	3,909	2		8,608
25	2,988	1,014	5,069	4		9,075
26	3,492	872	5,103	3		9,470
27	1,391	201	1,726			3,318
30	4,208	1,426	5,100	3		10,737
7/ 1	5,586	1,963	15,290	15		22,854
2	4,884	1,885	15,249	8		22,026
3	2,336	421	4,662	14		7,433
7	10,636	612	4,253	33		15,534
8	15,806	844	15,348	178		32,176
9	10,686	772	19,625	176		31,259
10	564	40	1,112	6		1,722
14	29,808	274	6,227	206		36,515
15	18,421	209	14,812	288		33,730
16	19,136	174	17,789	647		37,746
17	11,122	83	9,569	321		21,095
21	9,875	48	10,550	1,673		22,146
22	12,738	78	9,696	2,962	1	25,475
23	9,899	73	5,775	3,112	3	18,862
24	3,172	14	1,745	1,268		6,199
8/ 4	460	2	149	475	86	1,172
5	1,797	6	437	1,891	217	4,348
6	3,370	9	943	2,954	696	7,972
7	1,316	13	270	1,119	240	2,958
11	855	7	199	410	1,652	3,123

(continued)

Table 19. (continued)

Period 1/2/	Number of Fish				Coho	Total
	Sockeye	King	Chum	Pink		
8/12	909	14	245	401	1,928	3,497
13	325	7	65	145	1,098	1,640
14	102	1	18	32	286	439
18	107	1	23	17	514	662
19	280	6	74	67	2,839	3,266
20	173	8	40	45	3,508	3,774
21	92	5	27	17	2,685	2,826
25	42	2	14	19	1,674	1,751
26	30	2	1	6	1,211	1,250
27	50	4	8	22	3,220	3,304
28	10	1	2	3	1,353	1,369
9/ 1	14		2	1	619	636
2	18		3	8	1,129	1,158
3	18	2	2	2	1,254	1,278
4	12		1	1	1,342	1,356
9					224	224
10					395	395
Total	192,285	16,596	179,831	18,555	28,174	435,441
Percent of Section Catch	44.2	3.8	41.3	4.3	6.4	100.0

1/ Togiak River Section open 4 days per week.

2/ See emergency order table in 1986 Bristol Bay Annual Management Report for adjustments in the regular weekly fishing schedule.

Table 20. Commercial salmon catch by period and species, Kulukak Section, Togiak District, Bristol Bay, 1986.

Period 1/2/	Number of Fish					Total
	Sockeye	King	Chum	Pink	Coho	
6/16	16	16				32
17	73	85	92			250
18	138	184	265			587
19	185	113	194			492
20	12	15	9			36
21	96	60	125			281
23	1,429	150	961			2,540
24	2,081	192	2,155			4,428
25	3,006	178	3,397			6,581
26	2,800	170	2,687			5,657
27	1,897	98	1,198	1		3,194
28	463	27	287			777
30	4,708	318	2,743			7,769
7/ 1	6,683	253	3,418	6		10,360
2	8,592	188	3,464	12		12,256
3	5,715	67	1,673	2		7,457
7	8,284	174	3,661	23		12,142
8	16,056	171	6,278	78		22,583
9	20,426	142	4,409	71		25,048
15	5,443	39	4,712	53		10,247
16	4,142	63	2,413	186		6,804
17						
18						
19						
21	339	8	357	50		754
22	702	2	573	143		1,420
23	507	5	229	199		940
8/ 6	14	2	9	30	19	74
7	13	2	15	35	36	101
13	7		7	2	41	57

(continued)

Table 20. (continued)

Period 1/2/	Number of Fish				Cohos	Total
	Sockeye	Kings	Chums	Pinks		
8/18	16		1	4	630	651
19	27		4	10	917	958
20	25		4	9	1,204	1,242
21	1				565	566
25		1			235	236
27					162	162
28				1	38	39
Total	93,896	2,723	45,340	915	3,847	146,721
Percent of Section Catch	64.0	1.9	30.9	0.6	2.6	100.0

1/ Kulukak Section open 5 days per week.

2/ See emergency order table in 1986 Bristol Bay Annual Management Report for adjustments in the regular weekly fishing schedule.

Table 21. Commercial salmon catch by period and species, Matogak Section, Togiak District, Bristol Bay, 1986.

Period 1/2/	Number of Fish					Total
	Sockeye	King	Chum	Pink	Coho	
6/17	7	8	116			131
19	40	6	188			234
24	271	27	1,691			1,989
25	14	2	253			269
26	132	22	643			797
7/ 1	68	3	480			551
3	953	37	4,729	1		5,720
4	1,226	39	3,697	12		4,974
5	1,606	39	3,288	13		4,946
10	1,415	23	4,274	43		5,755
11	1,247	20	3,198	68		4,533
18	1,255	6	4,280	220		5,761
19	462	1	972	100		1,535
24	161	1	405	181	1	749
25	796	6	1,280	505	5	2,592
26	154	1	310	120	1	586
28	490	5	727	626	59	1,907
29	334	2	397	416	87	1,236
30	761	5	434	608	120	1,928
31	103	1	115	162	42	423
8/ 1	2		2			4
2	14		13	40	14	81
8	293	3	145	260	549	1,250
12	6		16	2	58	82
13	14	3	19	22	434	492
14	1	1	1	3	122	128
15	10	2	8	6	177	203
16	9		10	2	82	103
18	4		11	1	282	298
19	12	1	6	6	648	673
20	2		1	4	525	532
21				1	38	39
25	9	1			814	824
26	8			1	479	488
27					187	187
Total	11,879	265	31,709	3,423	4,724	52,000
Percent of Section Catch	22.8	0.5	61.0	6.6	9.1	100.0

1/ Matogak Section open 5 days per week.

2/ See emergency order table in 1986 Bristol Bay Annual Management Report for adjustments in the regular weekly fishing schedule.

Table 22. Commercial salmon catch by period and species, Osviak Section,
Togiak District, Bristol Bay, 1986.

Period 1/2/	Number of Fish				Coho	Total
	Sockeye	King	Chum	Pink		
6/17	1	32	16			49
18	12	36	236			284
19	99	47	189			335
20	96	51	354			501
21	15	2	78			95
26	27	21	69			117
7/ 3	106	2	293			401
4	939	35	1,954	1		2,929
5	29	1	208			238
9	250	1	1,047	4		1,302
10	434	7	1,427	2		1,870
11	1,378	31	4,369	43		5,821
12	257	2	428	4		691
17	233	2	779	18		1,032
18						
19	144	2	372	59		577
26	8		53	3		64
28	362	8	265	456	76	1,167
29	292	4	155	259	40	750
30	183	5	134	226	56	604
31	260	2	76	212	23	573
8/ 1	9	1	32	9	4	55
2						
5	8	1	5	3	2	19
8	40	2	41	57	142	282
9	36		47	56	144	283
12	135	4	110	99	1,124	1,472
13	75		38	56	945	1,114
14	22	1	7	5	195	230
15	38	1	15	17	424	495
16	10		1		88	99
18	8	1	4	5	510	528
19	35	1	10	4	1,329	1,379
20	11	1	23	8	1,137	1,180
21	15		5	4	943	967

(continued)

Table 22. (continued)

Period 1/2/	Number of Fish					Total
	Sockeye	King	Chum	Pink	Coho	
8/25	8	2		1	325	336
26	8	2		2	882	894
27	29	2	1	3	876	911
28		1	1		719	721
9/ 2	5				1,447	1,452
3					264	264
Total	5,617	311	12,842	1,616	11,695	32,081
Percent of Section Catch	17.5	1.0	40.0	5.0	36.5	100.0

1/ Osviak Section open 5 days per week.

2/ See emergency order table in 1986 Bristol Bay Annual Management Report for adjustments in the regular weekly fishing schedule.

Table 23. Total commercial salmon catch by day and district, in thousands of fish, Bristol Bay, 1986. 1/

Date	Time	Naknek- Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
5/27-6/8	13 days	+		+	8		8
6/ 9-15	7 days	+	2	2	24	+	28
16	24 hrs.	3	15	5		1	24
17	24 hrs.	8	28	14		2	52
18	24 hrs.	8	25	16		2	51
19	24 hrs.	3	19	13	19	3	57
20	24 hrs.	8	16	19		1	44
21	24 hrs.	4		26		+	30
22-27	6 days		46	+		60	106
28	24 hrs.		143			1	144
29-30	48 hrs.			+		19	19
7/ 1	24 hrs.		1	1	424	34	460
2	24 hrs.		841			34	875
3	24 hrs.	273	508	770	811	21	2,383
4	24 hrs.	381				8	389
5	24 hrs.	363	572	571		5	1,511
6	24 hrs.	140					140
7	24 hrs.		344	557		28	929
8	24 hrs.			721		55	776
9	24 hrs.	120	636		95	58	909
10	24 hrs.	363			67	9	439
11	24 hrs.	459	411	668	529	10	2,077
12	24 hrs.	251	128	18	365	1	763
13	24 hrs.	168	605	686	226		1,685
14	24 hrs.	82	171	207	174	37	671
15	24 hrs.	27	174	202	133	44	580
16	24 hrs.	4	159	246	88	45	542
17	24 hrs.	62	120	104	61	22	369
18	24 hrs.	64	47	75	81	6	273
19	24 hrs.	27	37	21	75	2	162
20-21	48 hrs.	168	15	37	107	23	350
22	24 hrs.	39	9	27	25	27	127
23-26	4 days	50	19	10	77	30	186
27-8/2	7 days	114	15	3	221	9	362
8/ 3- 9	7 days	2	16	9	30	18	75
10-16	7 days		8	10		13	31
17-23	7 days		8	10		20	38
24-9/10	19 days		5	9		19	33
Total		3,190	5,142	5,056	3,637	666	17,691

1/ Daily catches may not equal the sum of the district totals due to rounding.

Table 24. Commercial salmon catch by district and species, in numbers of fish, Bristol Bay, 1986. 1/

District and River System	Sockeye	King	Chum	Pink	Coho	Total
NAKNEK-KVICHAK DISTRICT						
Kvichak River	786,683					
Branch River	168,350					
Naknek River	1,934,861					
Total	2,889,894	3,552	208,066	85,723	3,078	3,190,313
EGEGIK DISTRICT	5,008,779	1,895	93,781	2,656	34,500	5,141,611
UGASHIK DISTRICT	4,928,502	2,977	98,782	101	25,562	5,055,924
NUSHAGAK DISTRICT						
Wood River	1,004,321					
Igushik River	631,233					
Nuyakuk River	1,122,176					
Nushagak-Mulchatna	+					
Snake River	+					
Total	2,757,730	63,859	461,966	280,623	72,896	3,637,074
TOGIAK DISTRICT						
Togiak Section	192,285	16,596	179,831	18,555	28,174	435,441
Kulukak Section	93,896	2,723	45,340	915	3,847	146,721
Matogak Section	11,879	265	31,709	3,423	4,724	52,000
Osviak Section	5,617	311	12,842	1,616	11,695	32,081
Total	303,677	19,895	269,722	24,509	48,440	666,243
TOTAL BRISTOL BAY	15,888,582	92,178	1,132,317	393,612	184,476	17,691,165
SPECIES PERCENT	89.8	0.5	6.4	2.2	1.0	100.0

1/ Apportionment of the inshore sockeye salmon catch by river system to the Naknek-Kvichak and Nushagak Districts is preliminary.

Table B. Daily sockeye salmon escapement tower counts by river system, Bristol Bay, 1986.

Date	Kvichak River		Naknek River		Egegik River		Ugashik River	
	Daily	Accum.	Daily	Accum.	Daily	Accum.	Daily	Accum.
6/21			0					
22			0					
23			24	24	348	348		
24			480	504	1,494	1,842		
25			630	1,134	4,860	6,702		
26	0	0	30	1,164	642	7,344		
27	0	0	6	1,170	9,774	17,118		
28	0	0	906	2,076	9,426	26,544		
29	0	0	14,172	16,248	9,708	36,252		
30	0	0	1,566	17,814	6,252	42,504		
7/ 1	48	48	414	18,228	24,186	66,690		
2	480	528	379,374	397,602	27,378	94,068	0	0
3	7,272	7,800	382,494	780,096	117,360	211,428	0	0
4	66,756	74,556	72,048	852,144	56,982	268,410	0	0
5	137,814	212,370	40,686	892,830	138,948	407,358	0	0
6	56,106	268,476	16,110	908,940	156,888	564,246	0	0
7	9,210	277,686	38,184	947,124	74,052	638,298	36	36
8	2,244	279,930	134,964	1,082,088	31,812	670,110	264	300
9	30,462	310,392	299,262	1,381,350	26,586	696,696	192	492
10	131,418	441,810	332,088	1,713,438	29,496	726,192	84	576
11	97,446	539,256	56,034	1,769,472	46,860	773,052	174	750
12	140,814	680,070	47,430	1,816,902	56,814	829,866	144	894
13	174,306	854,376	15,348	1,832,250	68,490	898,356	60	954
14	132,540	986,916	13,800	1,846,050	73,428	971,784	358,878	359,832
15	92,598	1,079,514	8,508	1,854,558	10,062	981,846	287,286	647,118
16>	22,728	1,102,242	57,415 1/	1,911,973	169,474 1/	1,151,320	40,518	687,636
17	7,428	1,109,670	48,564	1,960,537			46,542	734,178
18	5,652	1,115,322	4,971	1,965,508			58,950	793,128
19>	4,000 1/	1,119,322	1,839	1,967,347			43,158	836,286
20	3,000	1,122,322	2,543	1,969,890			14,796	851,082
21	8,000	1,130,322	2,970	1,972,860			9,396	860,478
22	24,000	1,154,322	1,650	1,974,510			29,520	889,998
23	15,000	1,169,322	825	1,975,335			34,680	924,678
24>	5,000	1,174,322	1,188	1,976,523			76,814 1/	1,001,492
25	3,000	1,177,322	858	1,977,381				
26	1,000	1,178,322	264	1,977,645				
27	1,000	1,179,322						
28								
29								
30								
31								
8/ 1								
2								
3								
Total	1,179,322		1,977,645		1,151,320		1,001,492	

Table 25. (continued)

Date	Wood River		Igushik River		Nuyakuk River		Togiak River	
	Daily	Accum.	Daily	Accum.	Daily	Accum.	Daily	Accum.
6/17	0	0	0	0				
18	0	0	0	0				
19	0	0	0	0				
20	0	0	0	0				
21	0	0	0	0				
22	0	0	0	0				
23	0	0	0	0				
24	174	174	0	0				
25	1,014	1,188	0	0				
26	444	1,632	0	0				
27	648	2,280	0	0				
28	414	2,694	0	0				
29	330	3,024	0	0				
30	756	3,780	78	78				
7/ 1	4,850	8,640	2,166	2,244	0	0	0	0
2	11,654	20,304	1,968	4,212	0	0	0	0
3	6,984	27,288	612	4,826	96	96	0	0
4	28,052	55,350	1,854	6,678	270	366	72	72
5	36,246	91,596	7,134	13,812	342	708	348	420
6	37,104	128,700	23,484	37,296	198	906	72	492
7	46,620	175,320	24,432	61,728	174	1,080	198	690
8	34,050	209,370	8,856	70,584	1,656	2,736	378	1,068
9	51,084	260,454	19,896	90,480	13,518	16,254	714	1,782
10	112,446	372,900	44,622	135,102	35,532	51,786	858	2,640
11	135,834	508,734	29,634	164,736	41,766	93,552	2,028	4,668
12	126,936	635,670	18,036	182,772	40,938	134,490	678	5,346
13	70,194	705,864	13,800	196,572	50,688	185,178	1,458	6,804
14	29,622	735,486	8,802	205,374	76,164	261,342	1,902	8,706
15	19,524	755,010	9,888	215,262	78,960	340,302	4,488	13,194
16>	19,650	774,660	18,870 1/	234,132	67,938	408,240	5,778	18,972
17	9,030	783,690	14,382	248,514	97,860	506,100	8,946	27,918
18	7,134	790,824	13,590	262,104	101,052	607,152	10,374	38,292
19	3,240	794,060	11,562	273,666	79,194	686,346	5,130	43,422
20	3,930	797,994	8,556	282,222	46,146	732,492	4,512	47,934
21	3,138	801,132	8,008	290,310	35,922	768,414	5,520	53,454
22	4,602	805,734	6,618	296,928	20,604	789,018	7,074	60,528
23	4,734	810,468	4,644	301,572	32,880 1/	821,898	6,558	67,086
24>	8,184 1/	818,652	6,156	307,728			10,428	77,514
25							6,036	83,550
26							8,700	92,250
27							6,264	98,514
28							5,226	103,740
29							5,280	109,020
30							7,836	116,856
31							8,406	125,262
8/ 1							9,456	134,718
2							8,394	143,112
3							7,050	150,162
4							5,376	155,538
5							5,430	160,968
6							4,206	165,174
7							1,524	166,698
8>							1,686 1/	168,384
Total	818,652		307,728		821,898		168,384	

1. Late season escapements were extrapolated using historic cumulative data for this river system.

Table 26. Daily salmon escapement as estimated with sonar, by species, Nushagak River, Bristol Bay, 1986.

Date	King		Sockeye		Chum		Pink		Coho		TOTAL	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
6/ 5	1	1	0	0	1	2	0	0	0	0	3	3
	9	10	3	3	8	10	0	0	0	0	21	24
	6	16	2	5	5	16	0	0	0	0	13	37
	11	27	3	8	6	21	0	0	0	0	19	56
6/10	51	78	15	23	37	58	0	0	0	0	103	159
	41	118	6	30	8	66	0	0	0	0	55	214
	82	201	15	45	25	90	0	0	0	0	122	336
	318	519	71	116	139	229	0	0	0	0	528	864
	297	816	76	192	166	395	0	0	0	0	539	1,403
6/15	101	916	32	225	79	474	0	0	0	0	212	1,615
	148	1,064	37	262	80	554	0	0	0	0	265	1,880
	43	1,107	16	278	40	594	0	0	0	0	99	1,979
	72	1,179	14	292	25	619	0	0	0	0	111	2,090
	424	1,603	112	403	245	864	0	0	0	0	781	2,871
6/20	789	2,392	141	545	220	1,084	0	0	0	0	1,150	4,021
	525	2,917	88	633	126	1,210	0	0	0	0	739	4,760
	521	3,438	119	752	235	1,445	0	0	0	0	875	5,635
	188	3,627	229	981	509	1,954	0	0	0	0	926	6,561
	274	3,901	270	1,251	757	2,710	0	0	0	0	1,301	7,862
6/25	516	4,417	1,091	2,342	6,649	9,359	0	0	0	0	8,256	16,118
	643	5,060	3,392	5,734	7,461	16,820	0	0	0	0	11,496	27,614
	999	6,059	4,282	10,016	9,871	26,691	0	0	0	0	15,152	42,766
	748	6,807	1,583	11,598	12,630	39,322	0	0	0	0	14,961	57,727
	405	7,212	853	12,451	6,843	46,165	0	0	0	0	8,101	65,828
6/30	443	7,656	946	13,397	7,480	53,645	0	0	0	0	8,869	74,697
	128	7,783	5,874	19,271	2,843	56,487	0	0	0	0	8,845	83,542
	181	7,964	9,468	28,739	4,135	60,623	0	0	0	0	13,784	97,326
	187	8,152	5,414	34,153	2,117	62,739	0	0	0	0	7,718	105,044
	82	8,234	18,067	52,220	2,568	65,307	0	0	0	0	20,717	125,761
7/ 5	782	9,016	34,648	86,868	7,630	72,937	0	0	0	0	43,060	168,821
	1,249	10,265	44,969	131,838	3,154	76,091	0	0	0	0	49,372	218,193
	2,256	12,521	57,760	189,597	1,128	77,219	0	0	0	0	61,144	279,337
	1,990	14,511	46,419	236,016	4,644	81,863	0	0	0	0	53,053	332,390
	2,192	16,703	41,217	277,233	5,551	87,414	0	0	0	0	48,960	381,350
7/10	1,843	18,546	104,907	382,140	11,008	98,422	0	0	0	0	117,758	499,108
	1,111	19,657	144,139	526,279	8,089	106,511	0	0	0	0	153,339	652,447
	3,891	23,549	125,352	651,631	27,386	133,897	0	0	0	0	156,629	809,076
	1,247	24,795	68,323	719,954	7,314	141,211	0	0	0	0	76,884	885,960
	1,447	26,242	20,310	740,264	2,138	143,349	215	215	0	0	24,110	910,070

Table 26. (continued)

Date	King		Sockeye		Chum		Pink		Coho		TOTAL	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/15	3,045	29,287	7,280	747,544	4,709	148,058	0	215	0	0	15,034	925,104
	1,166	30,453	17,099	764,643	5,500	153,558	1,809	2,024	708	708	26,283	951,387
	3,097	33,550	8,942	773,585	2,933	156,492	0	2,024	0	708	14,972	966,359
	1,146	34,696	3,798	777,384	1,223	157,714	0	2,024	0	708	6,167	972,526
	1,176	35,872	4,005	781,388	1,284	158,999	0	2,024	0	708	6,465	978,991
7/20	936	36,808	2,255	783,643	1,481	160,480	356	2,380	0	708	5,028	984,019
	738	37,546	1,820	785,463	1,136	161,616	255	2,635	0	708	3,949	987,968
	398	37,945	878	786,340	695	162,311	202	2,837	0	708	2,173	990,141
	288	38,232	2,273	788,613	752	163,063	4,330	7,168	575	1,284	8,218	998,359
	808	39,040	3,589	792,202	1,178	164,241	4,363	11,531	748	2,032	10,687	1,009,046
7/25	463	39,503	2,015	794,217	661	164,902	2,384	13,915	416	2,447	5,938	1,014,984
	618	40,121	1,370	795,587	161	165,063	625	14,540	234	2,681	3,008	1,017,992
	1,168	41,289	2,557	798,144	354	165,417	1,239	15,779	386	3,067	5,704	1,023,696
	120	41,409	329	798,473	120	165,537	6,853	22,632	184	3,251	7,606	1,031,302
	0	41,409	847	799,319	0	165,537	7,728	30,360	480	3,731	9,054	1,040,356
7/30	182	41,591	182	799,501	922	166,459	8,620	38,980	453	4,184	10,358	1,050,714
	60	41,651	60	799,561	305	166,764	4,297	43,277	226	4,410	4,949	1,055,663
	50	41,701	205	799,766	0	166,764	4,828	48,105	914	5,324	5,997	1,061,660
	0	41,701	248	800,014	0	166,764	7,738	55,843	1,426	6,750	9,412	1,071,072
	0	41,701	0	800,014	0	166,764	6,589	62,432	8,951	15,701	15,540	1,086,612
	787	42,488	663	800,677	641	167,405	3,878	66,310	7,144	22,846	13,113	1,099,725
8/ 5	381	42,870	322	800,999	310	167,715	1,883	68,193	3,461	26,307	6,357	1,106,082
	204	43,074	178	801,177	155	167,870	1,064	69,257	1,804	28,111	3,406	1,109,488
	87	43,161	69	801,246	80	167,949	386	69,643	831	28,942	1,453	1,110,941
	72	43,233	58	801,304	65	168,014	326	69,969	681	29,623	1,202	1,112,143
	66	43,299	52	801,355	62	168,076	284	70,253	636	30,260	1,100	1,113,243
8/10	135	43,434	98	801,453	141	168,217	507	70,760	1,362	31,622	2,242	1,115,485
	0	43,434	193	801,646	58	168,275	1,100	71,861	4,376	35,998	5,728	1,121,213
	0	43,434	224	801,871	0	168,275	66	71,927	2,009	38,007	2,300	1,123,513
	0	43,434	123	801,993	0	168,275	51	71,978	1,179	39,187	1,353	1,124,866
	0	43,434	195	802,188	0	168,275	124	72,102	2,106	41,292	2,424	1,127,290
8/15	0	43,434	67	802,255	0	168,275	43	72,145	728	42,020	838	1,128,128
	0	43,434	31	802,286	0	168,275	24	72,169	362	42,382	417	1,128,545
	0	43,434	38	802,324	0	168,275	20	72,189	391	42,772	449	1,128,994
TOTAL		43,434		802,324		168,275		72,189		42,772		1,128,994

Table 27. Salmon aerial survey escapement estimates by species, district and river system, in numbers of fish, Bristol Bay, 1986. 1/

District and River System	Sockeye		King		Chum		Pink		Coho	
	Index	Total	Index	Total	Index	Total	Index	Total	Index	Total
NAKNEK-KVICHAK DISTRICT										
Kvichak River	-	-	-	-	-	-	-	-	-	-
Branch River	-	230,180	7,200	-	107,000	-	146,000	-	600	-
Naknek River 2/	-	-	7,769	-	-	-	286,000	-	-	-
Total	-	230,180	14,969	-	107,000	-	432,000	-	600	-
EGEGIK DISTRICT										
Egegik River 3/	-	-	215	-	0	-	2,500	-	12,500	-
King Salmon River 4/	430	-	317	-	6,213	-	0	-	75	-
Total	430	-	532	-	6,213	-	2,500	-	12,575	-
UGASHIK DISTRICT										
Dog Salmon River	9,780	-	302	-	120	-	-	-	-	-
Mother Goose 5/	4,310	-	3,817	-	12,605	-	350	-	8,140	-
Upper Ugashik R.	-	-	54	-	0	-	0	-	315	-
Total	14,090	-	4,173	-	12,725	-	350	-	8,455	-
NUSHAGAK DISTRICT										
Muklung River	2,500	5,000	230	690	-	-	-	-	-	-
Nuyakuk River 6/	4,300	8,600	50	150	-	-	5,900	-	-	-
Nushagak River 7/	21,200	-	820	-	-	-	-	-	-	-
Mulchatna River 8/	12,800	25,600	810	-	-	-	-	-	-	-
Snake River	8,390	16,780	40	120	-	-	-	-	-	-
Total	49,190	55,980	1,950	960	-	-	5,900	-	-	-
TOGLAK DISTRICT										
Togliak River 9/	13,500	35,000	2,640	8,000	-	-	80,000	-	10,560	21,400
Kulukak River 10/	23,400	42,800	-	-	-	-	-	-	-	8,500
Total	36,900	77,800	2,640	8,000	-	-	80,000	-	10,560	30,200
TOTAL BAY	100,610	363,960	24,264	8,960	125,940	-	520,750	-	32,190	30,200

- 1/ Detailed information on aerial survey escapement estimates is published in an annual summary report. Estimates are categorized as: index - indices of total escapement; generally data is incomplete which will not allow determination of total escapement; total - aerial survey data is complete and does allow estimate of total escapement.
- 2/ Includes King Salmon, Pauls, and Big Creeks.
- 3/ Includes Shosky Creek.
- 4/ Includes Contact, Takayoto, Gertrude Creeks and several smaller tributaries.
- 5/ Includes Pumice, Old and Painter Creeks and Mother Goose system.
- 6/ Below the counting tower.
- 7/ Includes Iowithla, Kokwok, Klutispaw, and King Salmon Rivers.
- 8/ Includes Stuyahok and Koktuli Rivers.
- 9/ Minimal estimates from incomplete surveys.
- 10/ Includes Kulukak Lake and Tithe Creek ponds.

Table 28. Comparison of daily sockeye salmon escapement estimates by tower count, aerial survey and river test fishing enumeration methods, in thousands of fish, Kvichak River, Bristol Bay, 1986.

Date	Tower Count		Aerial Survey				River Test Fishing				Cumulative Escapement
	Daily	Cum.	Index	Index	Index to Tower	Total	Fish Per Index Pt.1/	Index Points			
								Daily	Cum.		
6/21											
22							0	0	0	0	
23							0	0	0	0	
24							0	0	0	0	
25							0	0	0	0	
26							0	0	0	0	
27	0	0					0	0	0	0	
28	0	0					0	0	0	0	
29	0	0					0	0	0	0	
30	0	0					732	2	2	1	
7/ 1	+	+					732	0	2	1	
2	+	1					78	18	20	2	
3	7	8					168	2,653	2,672	449	
4	67	75	83	97	54	233	62	1,107	3,780	235	
5	138	212	28	26	23	77 2/	70	127	3,907	274	
6	56	268	3	9	9	21	56	36	3,943	221	
7	9	278					71	37	3,979	281	
8	2	280	3	15	5	22	67	2,133	6,112	412	
9	30	310	83	71	19	173	86	1,545	7,657	658	
10	131	442	46	48	43	137	56	3,390	11,047	614	
11	97	539	109	61	27	198 2/	67	5,311	16,358	1,100	
12	141	680	137	127	61	325	61	4,608	20,966	1,272	
13	174	854	122	88	70	279	48	2,628	23,594	1,139	
14	133	987					41	2,137	25,731	1,062	
15	93	1,080									
16	23	1,102									
17	7	1,110									
18	6	1,115									
19	4	1,119									
20	3	1,122									
21	8	1,130	0	2	4	6					
22	24	1,154									
23	15	1,169									
24	5	1,174									
25	3	1,177									
Total		1,179							25,731	1,062	

1/ Fish per index point was based on lag time and/or catchability factors.

2/ Poor survey conditions.

Table 29. Comparison of daily sockeye salmon escapement estimates by tower count, aerial survey and river test fishing enumeration methods, in thousands of fish, Egegik River, Bristol Bay, 1986.

Date	Tower Count		Aerial Survey		River Test Fishing			Cumulative Escapement
	Daily	Cum.	Lagoon	Total	Fish Per Index Pt.1/	Index Points		
						Daily	Cum.	
6/18			+	+				
19					144	10	10	1
20					86	12	22	2
21					68	47	69	5
22					62	23	92	6
23	+	+			46	709	801	37
24	1	2			46	392	1,193	55
25	5	7			41	482	1,675	69
26	1	7	14	14	41	36	1,711	70
27	10	17	9	9	41	20	1,731	71
28	9	27			41	17	1,748	72
29	10	36	12	12	41	63	1,811	74
30	6	43			42	113	1,924	81
7/ 1	24	67	24	24	44	1,499	3,423	151
2	27	94	107	107	45	2,078	5,501	248
3	117	211	133	133	48	561	6,062	291
4	57	268			49	953	7,015	344
5	139	407	89	89	50	1,567	8,582	429
6	157	564			50	464	9,046	452
7	74	638	46	46	50	430	9,476	474
8	32	670	38	38	49	800	10,276	504
9	27	697	21	21	48	1,325	11,601	557
10	29	726	17	17	48	1,513	13,114	629
11	47	773	32	32	47	1,665	14,779	695
12	57	830	63	63	46	1,241	16,020	737
13	68	898			46	128	16,148	743
14	73	972	44	44	46	223	16,371	753
15	10	982						
2/ 169		1,151						
Total		1,151					16,371	753

- 1/ Fish per index point was originally based on the correlation between escapements and test fishing indices, and was adjusted inseason based on lag time and catchability relationships.
- 2/ Due to early termination of the counting program, late season escapement was extrapolated using long-term cumulative escapement data for this river system.

Table 30. Comparison of daily sockeye salmon escapement estimates by tower count, aerial surveys and river test fishing enumeration methods, in the mouth of fish, Deashik River, Bristol Bay, 1986.

Date	Tower Count		Aerial Survey		River Test Fishing		
	Daily	Cum.	Lagoon	Total	Fish Per Index Pt.1/	Index Points	
						Daily	Cum.
6/21					0	0	0
22					110	4	4
23					33	3	7
24					33	6	13
25					33	8	21
26					33	3	24
27					33	6	30
28					32	4	34
29					31	3	37
30					31	0	37
7/ 1					31	3	40
2	0	0			34	4	44
3	0	0			26	27	71
4	0	0			20	855	926
5	0	0	+	+	21	1,964	2,890
6	0	0			21	3,361	6,251
7	+	+	+	+	20	4,049	10,300
8	+	+	18	18	20	3,412	13,712
9	+	+	86	86	21	3,446	17,158
10	+	1	65	65	21	3,114	20,272
11	+	1	54	54	22	4,097	24,369
12	+	1	200	200	22	4,561	28,930
13	+	1			22	2,982	31,912
14	359	360	120	120	22	2,617	34,529
15	287	647			22	2,260	36,789
16	41	688					
17	47	734					
18	59	793					
19	43	836					
20	15	851					
21	9	860					
22	30	890					
23	35	925					
2/ 77	1,001						
Total		1,001				36,789	809

- 1/ Fish per index point was originally based on the correlation between escapements and test fishing indices, and was adjusted inseason based on lag time and catchability relationships.
- 2/ Due to early termination of the counting program, late season escapement was extrapolated using long-term cumulative escapement data for this river system.

Table 31. Comparison of daily sockeye salmon escapement estimates by tower count and aerial survey enumeration methods, in thousands of fish, Wood River, Bristol Bay, 1986.

Date	Tower Count		Aerial Survey 1/	
	Daily	Cum.	Number	Comments
6/23	0	0	0	Poor visibility.
24	+	+	0	
25	1	1	+	Poor vis.; poor light.
26	+	2	+	
27	1	2	+	A few fish holding in Silver Salmon Creek.
28	+	3	0	Rain and fog.
29	+	3	+	Fair to good visibility on p.m. survey.
30	1	4	+	Good visibility.
7/ 1	5	9	1	Good visibility.
2	12	20	2	Fair visibility.
3	7	27	2	Good visibility.
4	28	55	2	Glare and shadows impaired visibility.
5	36	92	4	Fish lighter in lower river.
6	37	129	8	7:00 a.m. 4,000; 2:30 p.m. 8,000, overcast windy.
7	47	175	15	Poor visibility.
8	34	209	5	Poor vis.; some fish coming out of muddy water.
9	51	260	19	8:00 a.m. 5,000; 3:05 p.m. 19,000, fair vis.
10	112	373	67	8:10 a.m. 67,000 (est. 150,000 in entire river); 4:00 p.m. 55,000.
11	136	509	112	9:30 a.m. 112,000 (est. 200,000 in entire river); 4:00 p.m. 34,000.
12	127	636	45	8:35 a.m. 45,000; 5:25 p.m. 12,000.
13	70	706	19	Fish looked heavy offshore in some areas.
14	30	735	6	Very poor visibility.
15	20	755		
16	20	775		
17	9	784		
18	7	791		
19	3	794		
20	4	798		
21	3	801		
22	5	806		
23	5	810		
24	8	819 2/		
Total		819		

- 1/ Estimated number of fish in clear water index areas immediately below the counting tower at the time of the survey.
- 2/ Due to early termination of the counting program, late season escapement was extrapolated using long-term (1953-85) cumulative escapement data for this river system.

Table 32. Inseason comparison of ocean age composition of sockeye salmon escapement using length frequency and scale analysis methods, Wood River, Bristol Bay, 1986. 1/

Date	2-Ocean (%)		3-Ocean (%)		Sample Size
	Length Frequency	Scales	Length Frequency	Scales	
7/ 1	47	33	53	67	90
4	54	44	46	55	195
5	43	40	57	60	150
7/ 1- 5	49	41	51	59	435
6	66	55	34	45	107
7	57	44	43	56	196
9	46	35	54	66	199
10	35	31	65	68	200
11	53	38	47	61	200
7/1-11	50	39	50	61	1,337
12	40	26	60	75	200
13	37	33	63	67	97
14	44	29	56	70	120
15	56	42	44	58	80
7/1-15	48	37	52	63	1,834
FINAL	48	35	52	65	1,811 2/
COMPOSITE FORECAST	52		48		
STANDARD FORECAST	45		55		

1/ Age composition as collected and analyzed on a daily inseason basis.

2/ Actual number of readable scales.

Table 1. Comparison of daily sockeye salmon escapement estimates by tower count, aerial survey and river test fishing enumeration methods, in thousands of fish, Igushik River, Bristol Bay, 1986.

Date	Tower Count		Aerial Survey 1/			River Test Fishing			
	Daily	Cum.	Lagoon	River	Total	Fish Per Index Pt.2/	Index Points		Cumulative Escapement
							Daily	Cum.	
6/22	0	0				16	32	32	
23	0	0				16	22	54	1
24	0	0				16	97	151	2
25	0	0				16	122	273	4
26	0	0				16	123	396	6
27	0	0	0	+	+	16	198	595	9
28	0	0				16	142	737	11
29	0	0	1	0	1	16	361	1,098	16
30	+	+				16	551	1,649	25
7/ 1	2	2	3	1	4	16	653	2,302	39
2	2	4	3	+	3	16	756	3,058	50
3	1	5	+	7	7	16	475	3,532	56
4	2	7				16	1,060	4,593	71
5	7	14				16	985	5,577	78
6	23	37	2	5	7	9	2,144	7,721	63
7	24	62	4	3	7	14	1,557	9,278	125
8	9	71	23	1	24	14	1,002	10,280	139
9	20	90	20	2	22	18	1,689	11,969	203
10	45	135	36	4	40	20	1,540	13,509	270
11	30	165	15	5	20	20	1,088	14,597	292
12	18	183	11	2	13	20	1,409	16,006	320
13	14	197				20	1,519	17,525	350
14	9	205	7	2	9	20	764	18,289	366
15	10	215							
16	19 3/	234	7	5	12				
17	14 3/	248	14	3	17				
18	14 3/	262	6	6	12				
19	12 3/	274							
20	9 3/	282	5	2	7				
21	8 3/	290	2	1	3				
22	7 3/	297							
23	5 3/	302							
24>	6 4/	308							
<hr/>									
Total		308						18,289	366

- 1/ Includes estimates of fish in clear water index areas immediately below the counting tower at the time of the survey.
- 2/ Fish per index point was originally based on the correlation between escapements and test fishing indices, and was periodically adjusted during the season based on lag time analysis.
- 3/ Escapement extrapolated from late run timing years (1960, '72, '76, and '81), while daily magnitude and escapement trends were further verified by aerial surveillance.
- 4/ Late season escapements were extrapolated using the long-term (1958-85) cumulative escapement data for this river system.

Table 14. Comparison of daily sockeye salmon escapement estimates by sonar count and aerial survey enumeration methods, in thousands of fish, Nushagak/Nuyakuk Rivers, Bristol Bay, 1986.

Date	Nushagak River Sonar Count		Nuyakuk River Tower Count		Aerial Survey 1/ Number		Comments
	Daily	Cum.	Daily	Cum.			
6/25	1*	2					
26	3	6			9		Poor vis. Mostly schooled chums.
27	4	10					
28	2	12					
29	1	12			4		Very poor visibility.
30	1	13					
7/ 1	6	19	0	0	22		Mostly sockeye.
2	9	29	0	0	14		Heavier near the sonar site.
3	5	34	+	+	7		Very poor visibility.
4	18	52	+	+	40		2-5 wide near Black Pt.
5	35	87	+	1	20		Lighter in middle area.
6	45	132	+	1	30		Minimal count due to poor vis.
7	58	190	+	1	79		3-4 wide in Angel Bay.
8	46	236	2	3	29		Strong at top 6-8 wide.
9	41	277	14	16	67		Heavier in lower river.
10	105	382	36	52	157		Strength still below the sonar.
11	144	526	42	94	239		Most on west bank.
12	125	652	41	134	123		Lighter in lower river.
13	68	720	51	185			
14	20	740	76	261			
15	7	748	79	340			
16	17	765	68	408			
17	9	774	98	506			
18	4	777	101	607			
19	4	781	79	686			
20	2	784	46	732			
21	2	786	36	768			
22	1	786	21	789			
23	2	789	33 2/	822			
24	4	792					
25	2	794					
26	1	796					
27	3	798					
28	+	798					
29	1	799					
30	+	800					
31	+	800					
8/ 1	+	800			+		Pink/coho survey. Poor vis.
2	+	800					
3	0	800					
4	1	801			+		Very poor visibility.
5>	1	802					
Total		802		822			

1/ Estimated total number of salmon in clear water index areas from Black Pt. to Portage Creek in lower Nushagak River.

2/ Late season escapements were extrapolated using sonar data and cumulative escapement data for 1985 index system.

Table 35. Daily sockeye salmon tower counts and aerial survey escapement estimates, in thousands of fish, Togiak River, Bristol Bay, 1986.

Date	Tower Count		Aerial Survey 1/				Comments
	Daily	Accum.	Togiak to Gech.	Gechiak to Ongi.	Ongivinuck to tower	Total	
7/2	0	0					
3	0	0					
4	+	+					
5	+	+					
6	+	+	1,200	1,000	200	2,400	Clear at top;
7	+	1					murky in middle;
8	+	1					fair at bottom.
9	1	2	300	2,300	750	3,350	Vis. fair;
10	1	3					9,400 chums.
11	2	5					
12	1	5					
13	1	7	3,700	8,600	10,000	22,300	Vis. good at
14	2	9					top; rain squalls
15	4	13					in middle; water
							dropping.
16	6	19	1,100	8,900	7,200	17,200	Vis. poor.
17	9	28					
18	10	38					
19	5	43					
20	5	48	19,500	24,200	11,100	54,800	Vis. excellent;
							Water dropping.
21	6	53					
22	7	61					
23	7	67					
24	10	77					
25	6	84					
26	9	92					
27	6	98	12,700	17,000	11,100	40,800	Vis. good;
28	5	104					lower sections
29	5	109					slightly turbid.
30	8	117					
31	8	125					
8/ 1	9	135					
2	8	143					
3	7	150					
4	5	155					
5	5	161					
6	4	165					
7	2	166					
8>	2	168					
Total		168					

1/ Includes estimates of fish in clear water index areas immediately below the counting tower at the time of the survey.

Table 36. Aerial survey escapement estimates of sockeye and coho salmon by major river drainage, in numbers of fish, Togiak District, 1986. 1/

Date	Sockeye Salmon			Coho Salmon		
	Togiak River	Kulukak River	Tithe Creek 2/	Togiak River	Gechiak Creek	Kulukak River
6/29		410				
7/ 6	2,400	3,200				
9	3,350	5,100				
13	22,300	7,300	0			
16	17,200	6,500	3,300			
20	54,800					
27	40,800		8,500			
8/21			13,700	2,120		500
10/ 2				2,560 3/		

- 1/ Escapement estimates reflect numbers of fish sighted at time of the survey; generally an expansion factor of 2 to 3 will approximate the total spawning population.
- 2/ Tithe Creek Ponds is the major producer of the Kanik River system.
- 3/ Incomplete survey - accounted for approximately 35% of the total escapement to Togiak River based on historic average data.

Table 37. Commercial salmon processors and buyers operating by district, Bristol Bay, 1986. 1/

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments
		Canned	Frozen	Cured	Fresh	Brine	
<u>NAKNEK-KVICHAK DISTRICT</u>							
1. Ak. Far East Corp.	Naknek			Shore			W/Victoria M.
2. Ak. Northern Seafoods	M/V Phoenix			Floater			
3. Ak. Seafood Proc.	M/V Trident, Yukon			Floater			
4. All Alaskan Seafoods	M/V Northern Alaska, Pacific Apollo			Floater			
5. American Eagle Seafoods	M/V Aleutian Dragon			Floater			Processed by Lafayette.
6. American Salmon Co.	Naknek				Air		
7. Bering Pacific Coop.	M/V Pribilof, Lafayette			Floater			
8. Bristol Red Seafoods	South Naknek				Shore		
9. Dagnet Fisheries	M/V Alaskan I			Floater			
10. Dutch Harbor Seafoods	M/V Galaxy, Dipper, Omnisea			Floater			
11. Farwest Fisheries	Naknek	1 1-lb.					Processed for Peter Pan and Dra.
		1 1/2 lb.					
12. Icicle Seafoods	M/V Arctic Star, Bering Star			Floater			
13. J. B. Seafoods	M/V Northland			Floater			
14. Keener Packing Co.	Naknek				Air		Tendered to Cordova. Processed for Bering Pacific.
15. Kemp Pacific Fisheries	M/V Bering Trader			Floater			
16. Kenai Packers	Pederson Point			Shore		Sea	
17. Lafayette, Inc.	M/V Lafayette, Pribilof			Floater			
18. Leader Creek	Dillingham				Air		Tendered to King Cove W/Sea Alaska.
19. Monte Handy Enterprises	Naknek			Shore			
20. Nelbro Packing Co.	Naknek	1 1-lb.	Shore				
		3 1/2 lb.					
		1 1/4 lb.					Tendered to King Cove W/Sea Alaska.
21. New West Fisheries	M/V Polar Ice			Floater			
22. Peter Pan Seafoods	M/V Blue Wave			Floater		Sea	
23. Queen Fisheries	Naknek				Air		
24. Ranier Seafoods	M/V Western Sea			Floater			W/Red Salmon & CWF.
25. Red Salmon Company	Naknek	2 1-lb.	Shore				
		2 1/2 lb.					
26. Sea Alaska Products	South Naknek, M/V Alaska Packer	1 1-lb.	Floater				
		3 1/2 lb.					W/Red Salmon & CWF.
27. South Naknek Seafoods	South Naknek		Shore				
28. Trident Seafoods	M/V Neptune, Bountiful, Tempest, Billiken		Floater				
29. Western Fish Producers	M/V Nicole N		Floater				
30. Woodbine Alaska	M/V Woodbine		Floater				
31. YAK, Inc.	M/V Yardarm Knot		Floater				
Total Naknek-Kvichak District:		4	24	2	4	2	

(continued)

Table 37. (continued)

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments
		Canned	Frozen	Cured	Fresh	Brine	
<u>EGEGIK DISTRICT</u>							
1. Ak. Far East Corp.	Naknek		Shore				
2. Ak. Premium Seafoods	M/V Grizzly		Floater				
3. All Alaskan Seafoods	M/V Northern Alaska, Pacific Apollo		Floater				
4. American Eagle Seafoods	M/V Aleutian Dragon		Floater				
5. Bering Pacific Coop.	M/V Pribilof, Lafayette		Floater				Processed by Lafayette
6. Bristol Monarch	M/V Bristol Monarch, Victoria M		Floater				W/Victoria M.
7. Columbia Wards Fisheries	Ekuk		Shore				W/Red Salmon & So. Naknek Seafoods.
8. Dragnet Fisheries	M/V Alaskan I		Floater				
9. Dutch Harbor Seafoods	M/V Galaxy, Dipper, Omnisea		Floater				
10. Farwest Fisheries	Naknek				Air		Canned in Naknek.
11. Icicle Seafoods	M/V Arctic Star, Bering Star		Floater				
12. International Seafoods	Egegik Beach				Air		
13. J. B. Seafoods	M/V Northland		Floater				
14. Kemp Pacific Fisheries	M/V Bering Trader		Floater				
15. Kenai Packers	Paderson Point		Shore			Sea	Tendered to Kodiak.
16. Lafayette, Inc.	M/V Lafayette, Pribilof		Floater				Processed for Bering Pacific. Canned in Naknek.
17. Nelbro Packing Co.	Naknek						
18. New West Fisheries	M/V Polar Ice		Floater				
19. Northcoast Seafoods	M/V Polar Bear		Floater				
20. Oceanic Seafoods	M/V Pacific Harvest, Harvestor Barge		Floater				
21. Peter Pan Seafoods	M/V Blue Wave		Floater			Sea	Tendered to King Cove and Dillingham.
22. Ranier Seafoods	M/V Western Sea		Floater				
23. Red Salmon Company	Naknek						W/So. Nak. Seaf. & CWF.
24. Sea Alaska Products	South Naknek, M/V Alaska Packer		Floater				Some canned in Naknek.
25. Snopac Products, Inc.	M/V Snopac, Snopac Alaska		Floater				
26. South Naknek Seafoods	South Naknek		Shore				W/Red Salmon & CWF.
27. Trident Seafoods	M/V Neptune, Bountiful Tempest, Billiken		Floater				
28. Western Fish Producers	M/V Nicole N		Floater				
29. Westward Fisheries	Big Creek (Egegik)		Shore				
30. Woodbine Alaska	M/V Woodbine		Floater				
31. YAK, Inc.	M/V Yardarm Knot		Floater				
Total Egegik District:		0	27	0	2	2	

(continued)

Table 37. (continued)

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments
		Canned	Frozen	Cured	Fresh	Brine	
UGASHIK DISTRICT							
1. Ak. Far East Corp.	Naknek		Shore				
2. AK. Northern Seafoods	M/V Phoenix		Floater				
3. Ak. Premium Seafoods	M/V Grizzly		Floater				
4. Ak. Seafood Processors	M/V Trident, Yukon		Floater				
5. All Alaskan Seafoods	M/V Northern Alaska, Pacific Apollo		Floater				
6. American Eagle Seafoods	M/V Aleutian Dragon		Floater				
7. American Salmon Co.	Naknek				Air		
8. Bering Pacific Coop.	M/V Pribilof, Lafayette		Floater				Processed by Lafayette.
9. Briggs Way	Ugashik	1 5-oz.	glass				
10. Bristol Monarch	M/V Bristol Monarch, Victoria M		Floater				W/Victoria M.
11. Dragnet Fisheries	M/V Alaskan I		Floater				
12. Dutch Harbor Seafoods	M/V Galaxy, Dipper, Omnisea		Floater				
13. Farwest Fisheries	Naknek						Some tendered to Naknek.
14. Icicle Seafoods	M/V Arctic Star, Bering Star		Floater				
15. J. B. Seafoods	M/V Northland		Floater				
16. Kemp Pacific Fisheries	M/V Bering Trader		Floater				
17. Kenai Packers	Pederson Point		Shore			Sea	Tendered to Cordova & Kodiak.
18. Lafayette, Inc.	M/V Lafayette, Pribilof		Floater				Processed for Bering Pacific.
19. Lang, R. L.	M/V Mary Lou		Floater				
20. New West Fisheries	M/V Polar Ice		Floater				
21. Northcoast Seafood	M/V Polar Bear		Floater				
22. Nuka Point Fisheries	M/V Maren I			Floater			
23. Nushagak Fish Co.	M/V Double Star		Floater				
24. Oceanic Seafoods	M/V Pacific Harvest, Harvestor Barge		Floater	Floater			
25. Peter Pan Seafoods	M/V Blue Wave		Floater				Some tendered to Dlg.
26. Queen Fisheries	M/V Mr. B.		Floater				W/Sea Alaska.
27. Ranier Seafoods	M/V Western Sea		Floater				
28. Sea Alaska Products	South Naknek, M/V Alaska Packer		Floater				W/Queen Fisheries.
29. Sea Fisher Products	M/V Arctic Fisher		Floater				
30. Snopac Products, Inc.	M/V Snopac, Snopac Alaska		Floater				
31. Trident Seafoods	M/V Neptune, Bountiful Tempest, Billiken		Floater			Sea	Tendered to Akutan.
32. Western Fish Producers	M/V Nicole N		Floater				
33. Westward Fisheries	Big Creek (Egegik)		Shore				
34. Westward Seafoods	M/V Westward		Floater				
35. Woodbine Alaska	M/V Woodbine		Floater				
36. YAK, Inc.	M/V Yardarm Knot		Floater				
Total Ugashik District:		1	32	2	1	2	

(continued)

Table 37. (continued)

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments
		Canned	Frozen	Cured	Fresh	Brine	
<u>NUSHAGAK DISTRICT</u>							
1. Ak. Far East Corp.	Naknek		Shore				Con. w/Trans.Asianic.
2. All Alaskan Seafoods	M/V All Alaskan		Floater				No. Alaskan, Pacific Apollo.
3. American Eagle Seafoods	M/V Aleutian Dragon		Floater				
4. Columbia Wards Fisheries	Ekuk		Shore		Air	Sea	Some tendered to Alitak.
5. Dagnet Fisheries	Dillingham		Floater		Air		
6. Dutch Harbor Seafoods	Dillingham		Floater				
7. Icicle Seafoods	Dillingham		Floater				
8. J. B. Seafoods	M/V Northland		Floater				
9. Kemp Pacific Fisheries	Dillingham		Shore		Air		
			Floater				
10. Kenai Packers/Pederson Point	Dillingham		Shore			Sea	Tendered to Kodiak and Cordova.
11. Lafayette, Inc.	M/V Pribilof		Floater				M/V Pribilof & Lafayette.
12. Leader Creek	Dillingham				Air		
13. New West Fisheries	M/V Polar Ice		Floater				M/V Polar Ice.
14. Northcoast Seafood Proc.	M/V Polar Bear		Floater				M/V Polar Bear.
15. Peter Pan Seafoods	Dillingham		Floater		Air	Sea	Con. w/Icicle Seafoods.
16. Queen Fisheries	Clarks Slough		Floater		Air		Con. w/Sea Alaska.
17. Ranier Seafoods	M/V Western Sea		Floater				
18. Sea Alaska Products	Clarks Point		Floater				Con. w/Queen Fish.; tendered to N/K for canning or freezing.
19. Snopac Products, Inc.	P/V Snopac		Floater				
20. Trident Seafoods	Dillingham		Floater			Sea	Tendered to Akutan.
21. Westward Seafoods	M/V Westward		Floater				
22. Western Fish Producers	M/V Nicolle M.		Floater				
23. Woodbine Alaska Fish Co.	M/V Woodbine		Floater				
24. YAK, Inc.	M/V Yardarm Knot		Floater				
Total Nushagak District:		0	24	0	6	4	

(continued)

Table 37. (continued)

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments
		Canned	Frozen	Cured	Fresh	Brine	
<u>TOGIAC DISTRICT</u>							Tendered to Nushagak. Kemp acted as their agent.
1. All Alaskan Seafoods	M/V All Alaskan		Floater				
2. Anpac	Anchorage				Air		
3. Kemp Paulucci	Togiak		Shore		Air		
4. Togiak Fisheries	Togiak		Shore		Air		
Total Togiak District:		0	3	0	3	0	

FISHERY OPERATOR SUMMARY										
District	Number of Operators						Number of Canning Lines 2/			
	Total 3/	Processing Method			Export		1 lb.	1/2 lb.	1/4 lb.	Total
		Canned	Frozen	Cured	Fresh	Brine				
Naknek-Kvichak	32	4	24	2	4	2	5	9	1	15
Egegik	31		27		2	2				
Ugashik	35	1	32	2	1	2			1	1
East Side	45	(5)	(34)	(4)	(6)	(3)	5	9	2	16
Nushagak	24		24		6	4				
Togiak	4		3		3					
West Side	26		(26)		(9)	(4)				
TOTAL BAY	48	5	36	4	13	4	5	9	2	16

- 1/ Indicates operators with either a physical plant or processing facility in a district or those operators from other areas buying fish and/or providing tender and support service for fishermen in districts away from the facility.
- 2/ Number of canning lines available for operation.
- 3/ Because some companies operate in more than one district, the total is less than the sum of the column.

Table 38. Case pack and commercial production of frozen and cured salmon by species and district, Bristol Bay, 1986. 1/

Category/ District	No. Operators 2/	Sockeye	King	Chum	Pink	Coho	Total
I. CASE PACK (48 - 1 lb. talls)							
Naknek-Kvichak	4	204,992	1,036	11,168	2,024	458	219,678
Egegik							
Ugashik	1	23	1			44	68
Nushagak							
Togiak							
Total	5	205,015	1,037	11,168	2,024	502	219,746
II. FROZEN (pounds)							
Naknek-Kvichak	24	11,738,045	48,269	1,367,617	275,075	2,452	13,431,458
Egegik	27	21,434,476	25,134	362,280	4,162	140,831	21,966,883
Ugashik	32	25,646,044	26,443	499,432	542	165,471	26,337,932
Nushagak	24	14,185,662	1,105,466	2,091,626	799,536	391,641	18,573,931
Togiak	3	2,006,660	216,067	1,809,684	95,921	372,588	4,500,920
Total	36	75,010,887	1,421,379	6,130,639	1,175,236	1,072,983	84,811,124
III. CURED (pounds)							
Naknek-Kvichak	2	147	71			2,169	2,387
Egegik							
Ugashik	2	1,446,867	1,160	42,453		16	1,490,496
Nushagak							
Togiak							
Total	4	1,447,014	1,231	42,453		2,185	1,492,883
IV. TOTAL FROZEN AND CURED (pounds)							
Naknek-Kvichak	26	11,738,192	48,340	1,367,617	275,075	4,621	13,433,845
Egegik	27	21,434,476	25,134	362,280	4,162	140,831	21,966,883
Ugashik	34	27,092,911	27,603	541,885	542	165,487	27,828,428
Nushagak	24	14,185,662	1,105,466	2,091,626	799,536	391,641	18,573,931
Togiak	3	2,006,660	216,067	1,809,684	95,921	372,588	4,500,920
Total	40	76,457,901	1,422,610	6,173,092	1,175,236	1,075,168	86,304,007

1/ Includes only fish processed in Bristol Bay. Data extracted primarily from "Final Operations Reports" (BB-CF/303), and from catch and production reports or fish tickets if unavailable in final report form.

2/ Because some companies operate in more than one district, the total may be less than the sum of the column.

Table 39. Salmon transported out of the area for processing, by district and species, Bristol Bay, 1986. 1/

I. FRESH EXPORT BY AIR 2/

District	No. Operators 3/	Export in Pounds				Coho	Total
		Sockeye	King	Chum	Pink		
Naknek-Kvichak	4	1,020,447	5,073	23,680	598	13,427	1,063,225
Egegik	1	1,364,695	6,055	49,408	5,479	73,663	1,499,300
Ugashik	2	1,195,976	28,619	22,055	280	12,750	1,259,680
Nushagak	6	8,101	138,014	3,274			149,389
Togiak	3	15,373	108,721	182,910		4,884	311,888
Total	13	3,604,592	286,482	281,327	6,357	104,724	4,283,482

II. BRINE EXPORT BY SEA 2/4/

District	Number of Tenders	Number	
		Fish	Pounds
Naknek-Kvichak	2	35,801	221,633
Egegik	2	84,544	507,330
Ugashik	2	238,175	1,436,368
Nushagak	4	357,126	2,183,713
Togiak			
Total	4	715,646	4,349,044

- 1/ Includes all fish exported from Bristol Bay in either brine or refrigerated sea water by sea-going tenders, or by air transportation.
- 2/ Export information extracted primarily from "Final Operations Reports" (BB-CF/303), and from catch and production reports or fish tickets if unavailable in final report form.
- 3/ Because some companies operate in more than one district, the total is less than the sum of the column.
- 4/ Some processors report mixed sockeye and chums and complete species breakdown is generally not available until fish are final processed.

Table 40. Mean round weight of the commercial salmon catch, by species and district in pounds, Bristol Bay, 1986.

District	Mean Round Weight 1/					Total
	Sockeye	King	Chum	Pink	Coho	
Naknek-Kvichak	6.14	15.63	6.51	4.00	5.47	
Egegik	5.93	16.83	6.21	3.78	6.71	
Ugashik	6.14	18.60	6.62	3.41	7.06	
Nushagak	5.88	19.87	6.49	3.27	5.91	
Togiak	6.67	16.34	7.39	3.91	7.79	
Mean Weight	6.04	18.84	6.70	3.47	6.71	
Total Weight of Catch, All Districts 2/	95,948	1,737	7,582	1,367	1,237	107,871

1/ Data extracted from "Bristol Bay Final Operations Report" (BB-CF/303) and "Bristol Bay Salmon Catch Reports" (BB-CF/301), and is weighted by the catch of each processor against the total catch.

2/ Total weight shown in thousands of pounds, and is derived from preliminary catch data.

Table 41. Price paid per pound and exvessel value of the commercial salmon catch in thousands of dollars, by species and district, Bristol Bay, 1986. 1/

PRICE PAID PER POUND 2/						
District	Sockeye	King	Chum	Pink	Coho	
Naknek-Kvichak	\$1.3857	\$.9142	\$.2993	\$.1351	\$.7292	
Egegik	1.4464	1.0139	.3347	.0813	.6148	
Ugashik	1.4349	.9774	.3267	.1507	.7097	
Nushagak	1.4268	1.0449	.3071	.1483	.7143	
Togiak	1.2838	1.0213	.2966	.2096	.7000	
Weighted Average	\$1.4240	\$1.0300	\$.3067	\$.1487	\$.6762	
TOTAL EXVESSEL VALUE 3/						
District	Sockeye	King	Chum	Pink	Coho	Total
Naknek-Kvichak	\$ 24,588	\$ 51	\$ 405	\$ 46	\$ 12	\$ 25,102
Egegik	42,961	32	195	1	142	43,331
Ugashik	43,422	54	214	+	128	43,818
Nushagak	23,136	1,320	921	136	308	25,821
Togiak	2,600	332	591	20	264	3,807
Total	\$136,707	\$1,789	\$2,326	\$ 203	\$ 854	\$141,879

1/ Data extracted from "Bristol Bay Final Operations Report" (BB-CF/303).

2/ Average price per pound derived from individual company price schedules and is weighted by the catch of each processor against the total catch.

3/ Preliminary catch in pounds times district average price; totals may not equal sum of district value due to rounding.

Table 42. Subsistence salmon catch by species, district and village area, Bristol Bay, 1986.

Area/River System	Permits Issued 1/	Number of Fish					
		Sockeye	King	Chum	Pink	Coho	Total
NAKNEK-KVICHAK DISTRICT:							
Naknek River 2/	226	17,860	730	338	1,932	506	21,366
Kvichak River:							
Levelock	23	6,402	119	254	53	140	6,968
Igiugig	6	1,560	6	77	1	1	1,645
Nondalton	30	6,522	102				6,624
Port Alsworth	23	3,204					3,204
Iliamna 3/	61	17,049	7	3	16		17,075
Pedro Bay	17	6,704					6,704
Kokhanok	23	17,982	331	23	5	3	18,344
TOTAL	412	77,283	1,295	695	2,007	650	81,930
EGEGIK DISTRICT							
Egegik River 4/	41	1,052	69	58	21	319	1,519
UGASHIK DISTRICT							
Ugashik River 5/	27	1,080	83	48	21	335	1,567
NUSHAGAK DISTRICT							
Nushagak Bay 6/	318	14,557	6,401	2,541	1,840	6,533	31,872
Aleknagik	24	4,764	129	1,888	12	86	6,879
Igushik River							
Manokotak	29	5,055	317	13	9	124	5,518
Nushagak River							
Ekuk	11	4,959	891	1,057	259	618	7,784
New Stuyahok	36	13,546	4,418	3,290	3,176	1,993	26,423
Koliganek	8	6,433	478	1,213	76	6	8,206
TOTAL	424	49,314	12,634	10,002	5,372	9,360	86,682
TOGLAK DISTRICT							
Togiak River 7/	29	2,382	745	827	64	480	4,498
TOTAL BRISTOL BAY	930	131,111	14,826	11,630	7,485	11,144	176,196

- 1/ Number of permits issued for subsistence fishing in each village area. Includes permits issued to nonresidents of the community, area, or district.
- 2/ Includes the communities of Naknek, South Naknek and King Salmon.
- 3/ Includes the village of Newhalen.
- 4/ Includes the villages of Egegik and North Egegik.
- 5/ Includes the villages of Pilot Point and Ugashik.
- 6/ These permits were issued in Dillingham and catches may include fish taken at Ekuk, Clarks Pt., Clarks Slough (Queen), Nushagak Pt., Kanakanak, Dillingham, lower Wood River, and Lewis Pt. fish camps.
- 7/ Includes the villages of Togiak and Twin Hills.

APPENDIX TABLES

Appendix Table 1. Forecast and inshore sockeye salmon return, in thousands of fish, Bristol Bay, 1967-86.

Year	Forecast				Inshore Return 5/	Forecast Error (%)			
	FRI 1/	ADF&G 2/	Japanese 3/	Pooled 4/		FRI	ADF&G	Japanese	Pooled
1967	21,500	13,749			10,353	108	33		
68	10,500	10,409			8,010	31	30		
69	16,200	21,274			19,043	- 15	12		
70	57,200	55,812			39,399	45	42		
71	18,100	15,170			15,825	14	- 4		
1972	6,600	9,744			5,400	22	80		
73	5,800	6,194	9,500		2,444	137	153	289	
74	3,900	5,004	7,600		10,966	- 64	- 54	- 31	
75	12,100	11,960	21,600		24,232	- 50	- 51	- 11	
76	9,800	11,969	22,300		11,539	- 15	4	93	
1977	8,800	8,380	19,300		9,722	- 9	- 14	99	
78	16,500	11,534	22,600		19,924	- 17	- 42	13	
79	14,740	22,650	22,300		39,904	- 63	- 43	- 44	
80		54,542	73,600		62,489		- 13	18	
81		26,700	26,800		34,475		- 23	- 22	
1982		34,625	28,300		22,208		56	27	
83		27,117	43,500	33,360	45,908		- 41	- 5	- 27
84		41,514	14,362	31,139	41,084 6/		1	- 65	- 24
85		25,321	41,900	35,028	36,629 6/		- 31	14	- 4
86		24,275	19,100	22,936	23,850 6/		2	- 20	- 4
Mean Percent Error						10	5	25	- 15

- 1/ Forecast by Fisheries Research Institute based upon purse seine data south of Adak, and is not broken down by river system.
- 2/ Inshore river system forecast by the Department is based on cycle analysis, smolt production and ratio of 2-ocean to 3-ocean age return.
- 3/ Hindcasted Japanese Research Catches forecast estimates using data only from years prior to the year for which estimate was made.
- 4/ Published pooled forecast for past years calculated as mean, weighted by inverse of variance, of several methods (1983: Standard ADF&G, Japanese Gill Net CPUE, and Escapement-Temperature Model; 1984: Standard ADF&G, Japanese Gill Net CPUE, Temperature-Length Model, Escapement-Temperature Model, and Bay-wide Sibling Returns; 1985 and 1986: Standard ADF&G and Japanese Research Catches).
- 5/ Inshore Bristol Bay catch plus escapement.
- 6/ Preliminary.

(Sources: 1, 5, 6, 7, and 16)

Appendix Table 2. Forecast and inshore pink salmon return, Nushagak District, Bristol Bay, 1966-86. 1/

Year	Number of Fish in Thousands		Forecast Error (Percent) 4/
	Forecast 2/	Inshore Return 3/	
1966	2,300	3,779	-39.14
68	4,500	3,866	16.40
1970	2,500	570	338.60
72	1,400	126	1,011.11
74	307	999	-69.27
76	3,047	1,063	90.08
78	3,193	13,735	-76.75
1980	15,700	4,988	214.76
82	9,200	2,996	207.08
84	1,710	6,081 4/	-71.88
86	4,067	353 4/	1,052.12
Mean Absolute Percent Error			243.01

1/ Includes even-years only.

2/ Based on escapement/return data from Nushagak/Nuyakuk Rivers.

3/ Inshore Nushagak District catch plus escapement.

4/ Preliminary.

5/ Percent error = (Forecast-Actual/Actual)x 100.

(Sources: 1, 5 and 6)

Appendix Table 3. Commercial salmon catch by the Japanese mothership and land-based drift net high seas fisheries, by species, in thousands of fish, 1967-86. 1/

Year	Sockeye		King		Chum		Pink		Coho		Total	
	MS	LB	MS	LB	MS	LB	MS	LB	MS	LB	MS	LB
1967	8,087	2,566	128	110	6,837	11,078	7,781	23,051	226	1,329	23,059	38,134
68	6,373	2,769	362	88	8,107	8,457	3,823	15,899	898	1,421	19,563	28,634
69	5,935	2,495	554	83	7,721	4,908	6,972	23,610	1,306	3,328	22,488	34,424
70	6,944	2,966	437	101	9,638	6,585	1,726	13,403	180	2,259	18,925	25,314
71	3,554	3,026	206	134	9,968	6,250	8,202	16,977	454	2,373	22,384	28,760
1972	3,184	3,711	261	103	13,373	8,598	3,795	14,839	614	2,421	21,227	29,672
73	2,613	3,308	119	162	7,857	7,614	12,018	20,650	989	3,794	23,596	35,528
74	2,282	3,155	361	186	9,283	12,179	7,756	11,242	1,085	3,559	20,767	30,321
75	2,171	2,969	162	135	7,367	11,480	14,654	15,347	356	3,550	24,710	33,481
76	2,266	3,291	283	201	10,436	10,646	7,207	10,879	828	2,751	21,020	26,690
1977	1,508	1,289	93	146	5,996	6,230	9,100	15,041	79	1,722	16,776	24,428
78	1,882	1,292	105	210	3,802	3,488	1,853	7,846	609	2,512	8,251	15,349
79	2,186	756	126	161	3,277	2,661	3,405	11,190	281	1,199	9,275	15,967
80	2,412	787	704	160	3,098	2,697	561	11,612	656	1,205	7,431	16,461
81	2,224	859	88	190	2,539	2,509	4,094	11,292	615	1,209	9,560	16,059
1982	1,738	723	107	165	3,217	2,930	1,654	11,035	1,183	1,201	7,899	16,054
83	1,655	828	87	178	3,081	2,395	4,324	11,308	297	1,122	9,444	15,831
84	1,597	305	82	92	3,275	2,214	1,430	9,727	786	894	7,170	13,232
85	1,138	155	66	100	2,836	1,432	2,717	9,973	128	766	6,885	12,426
86 2/	729	148	60	76	1,925	959	390	4,513	65	483	3,169	6,179
20 Year Average	3,024	1,870	220	139	6,182	5,766	5,173	13,472	582	1,955	15,180	23,201
1967-76 Average	4,341	3,026	287	130	9,059	8,780	7,393	16,590	694	2,679	21,774	31,204
1977-86 Average	1,707	714	152	148	3,305	2,752	2,953	10,354	470	1,231	8,586	15,199

1/ Mothership fishery (MS) and land-based fishery (LB).

2/ Preliminary.

(Sources: 1 and 19)

Appendix Table 4. Japanese mothership commercial catch of maturing and immature sockeye salmon of Bristol Bay origin, in thousands of fish, 1967-86.

Year	Matures 1/	Immatures 2/	Total
1967	866	21	887
68	864	791	1,655
69	1,240	517	1,757
70	3,451	1,207	4,658
71	842	592	1,434
1972	710	214	924
73	625	259	884
74	251	708	959
75	645	222	867
76	779	228	1,007
1977	540	328	868
78	124	236	360
79	68	410	478
80	180	681	861
81	137	380	517
1982	63	228	291
83	96	240	336
84	51	260	311
85	0	264	264
86	34	95	129
20 Year Average	578	394	972
1967-76 Average	1,027	476	1,503
1977-86 Average	129	312	442

1/ Includes May and June 1-10 catches east of 170 degrees east, June 11-20 catches east of 175 degrees east, and June 21-30 catches east of 180 degrees.

2/ Includes sockeye salmon taken on the high seas at times and in areas where immature Bristol Bay sockeye salmon are in large majority. These are mostly .2 ocean age fish that otherwise would be expected to mature and return to Bristol Bay as .3 ocean fish. Includes July and August catches east of 170 degrees east, and June 21-30 catches between 170 degrees east and 180 degrees east.

3/ Preliminary.

(Sources: 1 and 19)

Appendix Table 5. Inshore domestic and Japanese mothership high seas commercial catch of sockeye salmon of Bristol Bay origin, in thousands of fish, 1967-86.

Year	Bristol Bay Catch			Bristol Bay		Percent Japanese Catch of:	
	Inshore	Japanese 1/	Total	Escapement	Total Return 2/	Total Catch	Total Bay Run
1967	4,331	922	5,253	6,022	11,275	18	8
68	2,793	885	3,678	5,217	8,895	24	10
69	6,622	2,031	8,653	12,421	21,074	24	10
70	20,721	3,968	24,689	18,679	43,368	16	9
71	9,584	2,049	11,633	6,241	17,874	18	12
1972	2,416	1,302	3,718	2,984	6,702	35	19
73	761	839	1,600	1,683	3,283	52	26
74	1,362	510	1,872	9,603	11,475	27	4
75	4,899	1,353	6,252	19,333	25,585	23	5
76	5,619	1,001	6,620	5,920	12,540	15	8
1977	4,878	768	5,646	4,844	10,490	14	7
78	9,928	452	10,380	9,996	20,376	4	2
79	21,429	304	21,733	18,475	40,208	1	1
80	23,762	590	24,352	38,727	63,079	2	1
81	25,603	818	26,421	8,872	35,293	3	2
1982	15,104	443	15,547	7,104	22,651	3	2
83	37,372	324	37,696	8,536	46,232	1	1
84	24,684	291	24,975	16,400	41,375	1	1
85	23,474	260	23,734	13,156	36,890	1	1
86	15,889 3/	298 3/	16,187	7,960	24,147	2	1
20 Year Average	13,062	970	14,032	11,109	25,141	7	4
1967-76 Average	5,911	1,486	7,397	8,810	16,207	20	9
1977-86 Average	20,212	455	20,667	13,407	34,074	2	1

1/ Includes immature fish caught in previous year.

2/ Includes Bristol Bay catch and escapement and Japanese catch.

3/ Preliminary.

(Sources: 1, 5, and 19)

Appendix Table 6. Japanese mothership commercial catch of king salmon of western Alaska origin, in thousands of fish, 1967-86.

Year	Total Mothership Catch	Catch of Western Alaska Origin	
		Number	Percent
1967	128	71	55
68	362	244	67
69	554	367	66
70	437	312	71
71	206	132	64
1972	261	189	72
73	119	56	47
74	361	208	58
75	162	108	67
76	283	117	41
1977	93	55	59
78	105	36	34
79	126	69	55
80	704	416	59
81	88	30	34
1982	107	45	42
83	87	31	36
84	82	36	44
85	66	25	38
86 1/	60	24	40
20 Year Average	220	129	53
1967-76 Average	287	180	61
1977-86 Average	152	77	44

1/ Preliminary.

(Sources: 1 and 19)

Appendix Table 7. Salmon fishing license and entry permit registration by gear type and residency, Bristol Bay, 1967-86. 1/

Year	Drift Net 2/			Set Net 2/			Total
	Resident	Non-Resident	Total	Resident	Non-Resident	Total	
1967	965	734	1,699	686	144	830	2,529
68	973	711	1,684	722	117	839	2,523
69	1,110	818	1,928	804	166	970	2,898
70	1,057	824	1,881	747	143	890	2,771
71	1,034	831	1,865	710	136	846	2,711
1972	993	771	1,764	722	132	854	2,618
73 3/	2,041	1,162	3,203	902	108	1,010	4,213
74 4/	634(634)	238(238)	872	530(530)	95(95)	625	1,497
75	1,217(450)	843(194)	2,060	751(159)	169(45)	920	2,980
76	987(69)	734(30)	1,721	625(5)	139(0)	764	2,485
1977	999(52)	729(13)	1,728	684(15)	156(1)	840	2,568
78	1,039(66)	738(11)	1,777	749(16)	161(3)	910	2,687
79	1,046(73)	754(10)	1,800	764(19)	170(5)	934	2,734
80	1,060(92)	767(18)	1,827	760(29)	187(5)	947	2,774
81	1,056(89)	771(18)	1,827	754(37)	202(5)	956	2,783
1982	1,050(85)	774(15)	1,824	744(36)	213(5)	957	2,781
83	1,071(79)	750(16)	1,821	740(33)	220(3)	960	2,781
84	1,050(73)	768(16)	1,818	744(28)	218(3)	962	2,780
85	1,061(83)	772(13)	1,833	733(24)	217(4)	950	2,783
86	1,059(78)	775(17)	1,834	727(18)	223(4)	950	2,784
20 Year Average	1,075	763	1,838	730	166	896	2,734
1967-76 Average	1,101	767	1,868	720	135	855	2,723
1977-86 Average	1,049	760	1,809	740	197	937	2,746

1/ Total license/permit registration; not all license/permittee's actually fished.

2/ Allowable gear per license/permit is 150 fathoms for drift and 50 fathoms for set with the following exceptions: 1968 and 1975 - 75 F. drift and 25 F. set; 1969 - 125 F. drift; 1973 - 25 F. drift and 12 1/2 F. set.

3/ Sliding gear scale in effect.

4/ Limited Entry went into effect. Figures in parenthesis are interim-use permits, and are included in the totals.

(Sources: 2 and 15)

Appendix Table 6. Salmon fishing interim-use and permanent entry permits actually fished, by gear type, Bristol Bay, 1975-86.

Year	Number Permits Issued 1/			Permits Fished	
	Interim-Use	Permanent	Total	Number	Percent
<u>DRIFT GILL NET</u>					
1975	644	1,416	2,060	1,235	60
76	99	1,622	1,721	1,353	79
77	65	1,663	1,728	1,355	78
78	77	1,700	1,777	1,569	88
79	83	1,717	1,800	1,711	95
1980	110	1,717	1,827	1,762	96
81	107	1,720	1,827	1,783	98
82	100	1,724	1,824	1,791	98
83	95	1,726	1,821	1,797	99
84	89	1,729	1,818	1,798	
85	96	1,738	1,834	1,813	99
86 2/	95	1,743	1,838	3/	
Average	138	1,685	1,823	1,633	90
<u>SET GILL NET</u>					
1975	204	716	920	445	48
76	5	759	764	501	66
77	16	824	840	495	59
78	19	891	910	650	71
79	24	910	934	768	82
1980	34	913	947	804	85
81	42	914	956	841	88
82	41	916	957	859	90
83	36	924	960	861	90
84	31	931	962	866	90
85	28	931	959	872	91
86	22	940	962	3/	
Average	42	881	923	724	78
<u>TOTAL DRIFT/ SET GILL NET</u>					
1975	848	2,132	2,980	1,680	56
76	104	2,381	2,485	1,854	75
77	81	2,487	2,568	1,850	72
78	96	2,591	2,687	2,219	83
79	107	2,627	2,734	2,479	91
1980	144	2,630	2,774	2,566	93
81	149	2,634	2,783	2,624	94
82	141	2,640	2,781	2,650	95
83	131	2,650	2,781	2,658	96
84	120	2,660	2,780	2,664	96
85	124	2,669	2,793	2,685	96
86	117	2,683	2,800	3/	
Average	180	2,482	2,662	2,357	90

1/ Number of permanent permits includes unexpired permits.

2/ Preliminary.

3/ Number of permits fished not available.

(Source: 15)

Appendix Table 9. Sockeye salmon commercial catch by district, in numbers of fish, Bristol Bay, 1967-86.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1967	2,337,226	1,070,942	163,744	657,711	101,107	4,330,730
68	1,216,858	671,554	82,457	749,281	72,699	2,792,849
69	4,655,072	889,322	169,845	773,207	134,252	6,621,698
70	17,803,805	1,403,509	171,541	1,188,534	153,377	20,720,766
71	5,857,378	1,306,682	954,068	1,256,799	209,060	9,583,987
1972	1,102,365	839,820	17,440	381,347	75,261	2,416,233
73	168,249	221,337	3,920	272,093	95,723	761,322
74	538,163	172,253	2,151	510,571	139,341	1,362,479
75	3,085,416	964,024	14,558	645,902	188,914	4,898,814
76	2,547,276	1,329,788	174,923	1,265,422	301,883	5,619,292
1977	2,167,214	1,780,567	92,623	619,025	218,451	4,877,880
78	5,123,668	1,207,294	7,995	3,137,166	452,016	9,928,139
79	14,991,826	2,257,332	391,118	3,327,346	460,984	21,428,606
80	15,120,457	2,623,066	885,875	4,497,787	634,561	23,761,746
81	10,992,809	4,361,406	2,116,066	7,493,093	639,707	25,603,081
82	5,005,802	2,447,514	1,139,192	5,916,187	595,696	15,104,391
83	21,559,372	6,755,256	3,349,451	5,119,744	588,208	37,372,031
84 1/	14,237,955	5,301,198	2,661,330	2,164,667	318,863	24,684,013
85 1/	8,135,810	7,457,295	6,346,489	1,323,492	210,470	23,473,556
86 1/	2,889,894	5,008,779	4,928,502	2,757,730	303,677	15,888,582
20 Year Average	6,976,831	2,403,447	1,183,664	2,202,855	294,713	13,061,510
1967-76 Average	3,931,181	886,923	175,465	770,087	147,162	5,910,817
1977-86 Average	10,022,481	3,919,971	2,191,864	3,635,624	442,263	20,212,203

1/ Preliminary.

(Sources: 1 and 5)

Appendix Table 10. King salmon commercial catch by district, in numbers of fish, Bristol Bay, 1967-86.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1967	3,705	2,285	1,582	96,240	13,381	117,193
68	6,398	3,472	2,153	78,201	13,499	103,723
69	19,016	2,801	2,107	80,803	20,181	124,908
70	19,037	3,765	1,498	87,547	28,664	140,511
71	10,254	2,187	779	82,769	27,026	123,015
1972	2,262	1,097	166	46,045	19,976	69,546
73	951	1,475	292	30,470	10,856	44,044
74	480	1,133	1,200	32,053	10,798	45,664
75	964	237	111	21,454	7,226	29,992
76	4,064	1,138	338	60,684	29,744	95,968
1977	4,373	3,694	2,167	85,074	35,218	130,526
78	6,930	3,126	5,935	118,548	57,000	191,539
79	10,415	5,547	9,568	157,321	30,022	212,873
80	7,517	5,610	4,900	64,958	12,543	95,528
81	11,048	5,468	3,416	193,461	23,911	237,304
1982	12,425	4,834	7,170	195,287	38,786	253,502
83	8,955	4,758	9,276	137,123	38,497	198,609
84 1/	9,198	4,707	4,782	61,124	21,920	101,731
85 1/	5,891	3,844	6,509	67,623	37,355	121,222
86 1/	3,552	1,895	2,977	63,859	19,895	92,178
20 Year Average	7,372	3,154	3,346	88,032	24,575	126,479
1967-76 Average	6,713	1,959	1,023	61,627	18,135	89,456
1977-86 Average	8,030	4,348	5,670	114,438	31,015	163,501

1/ Preliminary.

(Sources: 1 and 5)

Appendix Table 11. Chum salmon commercial catch by district, in numbers of fish, Bristol Bay, 1967-86.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1967	49,606	11,039	14,104	338,286	63,322	476,357
68	43,187	16,193	17,624	178,786	108,001	363,791
69	42,535	7,835	1,995	214,235	66,389	332,989
70	120,279	43,854	17,969	435,033	100,711	717,846
71	151,465	27,073	14,506	360,015	123,847	676,906
1972	115,737	42,172	9,689	310,126	178,885	656,609
73	123,610	23,034	6,092	336,331	195,431	684,498
74	41,347	4,022	2,334	157,941	80,710	286,354
75	79,740	4,094	1,634	152,891	87,058	325,417
76	317,550	46,955	9,924	801,064	153,559	1,329,052
1977	340,228	83,121	4,456	899,701	270,649	1,598,164
78	185,451	44,480	1,449	651,743	274,967	1,158,090
79	196,398	38,004	12,174	440,279	219,942	906,797
80	204,515	78,556	36,343	681,930	299,682	1,301,026
81	355,943	87,581	36,275	795,143	229,886	1,504,828
1982	198,019	84,329	53,204	434,817	151,000	921,369
83	351,769	127,490	105,171	725,060	322,691	1,632,181
84 1/	426,235	183,317	210,694	679,845	339,064	1,839,155
85 1/	175,598	109,788	118,652	252,748	206,370	863,156
86 1/	208,066	93,781	98,782	461,966	269,722	1,132,317
20 Year Average	186,364	57,836	38,654	328,471	115,791	935,345
1967-76 Average	108,506	22,627	9,587	602,323	258,397	584,982
1977-86 Average	264,222	93,045	67,721	465,397	187,094	1,285,708

1/ Preliminary.

(Sources: 1 and 5)

Appendix Table 12. Pink salmon commercial catch by district, in numbers of fish, Bristol Bay, 1967-86.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1967	20			265	829	1,114
68	218,732	211		1,705,150	11,743	1,935,836
69	205	5	1	263	1,396	1,870
70	28,301	41		417,834	10,735	456,911
71	2			37	173	212
1972	57,074	12		67,953	1,984	127,023
73	109		1	61	216	387
74	508,534	4,405	340	413,613	13,086	939,978
75	6	9	2	126	279	422
76	264,631	4,121	116	739,590	28,085	1,036,543
1977	19		5	3,017	1,476	4,517
78	734,880	11,430	530	4,348,336	57,524	5,152,700
79	134	6	9	1,787	1,913	3,849
80	288,363	2,476	51	2,202,545	70,033	2,563,468
81	194	222	29	345	6,490	7,280
82	127,560	1,997	170	1,339,272	23,417	1,492,416
83	51	92		137	204	484
84 1/	207,134	5,679	872	3,154,339	20,550	3,388,57
85 1/	27	51	3	54	341	476
86 1	85,723	2,656	101	280,623	24,509	393,612
20 Year Average 2/	252,093	3,303	218	1,466,926	26,167	1,748,706
1967-76 Average	215,454	1,758	91	668,828	13,127	899,258
1977-86 Average	288,732	4,848	345	2,265,023	39,207	2,598,154

1/ Preliminary.

2/ Includes even-years only.

(Sources: 1 and 5)

Appendix Table 13. Coho salmon commercial catch by district, in numbers of fish, Bristol Bay, 1967-86.

Year	Naknek-Kvichak	Egegik	Ugashik	Mushagak	Togiak	Total
1967	1,175	1,044	1,901	31,517	18,159	53,796
68	7,357	6,507	5,771	48,867	24,872	93,374
69	17	5,548	9,292	37,799	28,720	81,376
70	53	7,027	1,695	3,688	2,027	14,490
71	89	923	469	8,036	3,192	12,709
1972	402	1,249		3,654	8,652	13,957
73	255	2,701	2,307	28,709	23,070	57,042
74	916	1,156	4,055	12,569	25,049	43,745
75	43	951	4,595	7,342	33,350	46,281
76	1,195	2,321	3,561	6,778	12,791	26,646
1977	2,883	2,685	3,884	52,562	45,201	107,215
78	913	2,256	2,024	44,740	44,338	94,271
79	12,355	15,148	17,886	129,607	119,403	294,399
80	7,802	22,537	19,419	147,726	151,000	348,484
81	1,229	32,759	30,220	220,290	29,207	313,705
1982	10,586	74,989	50,803	349,669	133,765	619,812
83	7,282	25,954	7,816	81,338	5,711	128,101
84 1/	2,805	66,179	68,788	271,570	170,948	580,290
85 1/	7,706	32,732	60,914	20,285	39,176	160,813
86 1/	3,078	34,500	25,562	72,896	48,440	184,476
20 Year Average	3,407	16,958	16,893	78,982	48,354	163,749
1967-76 Average	1,150	2,943	3,738	18,896	17,988	44,342
1977-86 Average	5,664	30,974	28,732	139,068	78,719	283,157

1/ Preliminary.

(Sources: 1 and 5)

Appendix Table 14. Total salmon commercial catch by district, in numbers of fish, Bristol Bay, 1967-86.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1967	2,391,732	1,085,310	181,331	1,124,019	196,798	4,979,190
68	1,492,532	697,937	108,005	2,760,285	230,814	5,289,573
69	4,716,845	905,511	183,240	1,106,307	250,938	7,162,841
70	17,971,475	1,458,196	192,703	2,132,636	295,514	22,050,524
71	6,019,188	1,336,865	969,822	1,707,656	363,298	10,396,829
1972	1,277,840	884,350	27,295	809,125	284,758	3,283,368
73	293,174	248,547	12,612	667,664	325,296	1,547,293
74	1,089,440	182,969	10,080	1,126,747	268,984	2,678,220
75	3,166,169	969,315	20,900	827,715	316,827	5,300,926
76	3,134,716	1,384,323	188,862	2,873,538	526,062	8,107,501
1977	2,514,717	1,870,067	103,144	1,659,379	570,995	6,718,302
78	6,051,842	1,268,586	17,933	8,300,533	885,845	16,524,739
79	15,211,128	2,316,037	430,755	4,056,340	832,264	22,846,524
80	15,628,654	2,732,245	946,588	7,594,946	1,167,819	28,070,252
81	11,361,223	4,487,436	2,186,006	8,702,332	929,201	27,666,198
1982	5,354,392	2,613,663	1,250,539	8,235,232	937,664	18,391,490
83	21,927,429	6,913,550	3,471,714	6,063,402	955,311	39,331,406
84 1/	14,883,327	5,561,080	2,946,466	6,331,545	871,345	30,593,763
85 1/	8,325,032	7,603,710	6,532,567	1,664,202	493,712	24,619,223
86 1/	3,190,313	5,141,611	5,055,924	3,637,074	666,243	17,691,165
20 Year Average	7,300,058	2,483,065	1,241,824	3,569,034	568,484	15,162,466
1967-76 Average	4,155,311	915,332	189,485	1,513,569	305,929	7,079,627
1977-86 Average	10,444,806	4,050,799	2,294,164	5,624,499	831,040	23,245,306

1/ Preliminary.

(Sources: 1 and 5)

Appendix Table 15. Commercial salmon catch in percent by gear type and species, Bristol Bay, 1964-83.

Year	Sockeye		King		Chum		Pink 1/		Coho		Total
	Drift	Set	Drift	Set	Drift	Set	Drift	Set	Drift	Set	Drift
1964	86	14	94	6	86	14	88	12	70	30	86
65	92	8	94	6	88	12	88	12	56	44	92
66	89	11	95	5	87	13	89	11	76	24	89
67	89	11	97	3	96	4	74	26	81	19	90
68	90	10	98	2	95	5	89	11	76	24	90
1969	88	12	96	4	95	5	84	16	75	25	89
70	93	7	94	6	94	6	82	18	45	55	93
71	90	10	98	2	94	6	85	15	64	36	90
72	93	7	98	2	95	5	75	25	84	16	93
73	92	8	97	3	96	4	86	14	75	25	93
1974	79	21	97	3	95	5	89	11	75	25	84
75	91	9	96	4	94	6	61	39	80	20	91
76	90	10	94	6	96	4	89	11	63	37	91
77	89	11	96	4	96	4	88	12	83	17	90
78	88	12	97	3	95	5	89	11	76	24	89
1979	87	13	94	6	92	8	73	27	79	21	88
80	86	14	89	11	91	9	88	12	78	22	86
81	84	16	92	8	92	8	67	33	73	27	85
82	87	13	92	8	90	10	74	26	74	26	86
83	89	11	88	12	93	7	45	55	55	45	90
20 Year Average	89	11	95	5	93	7	85	15	72	28	89
1964-73 Average	90	10	96	4	93	7	85	15	70	30	91
1974-83 Average	87	13	94	7	93	7	86	14	74	26	88

1/ Averages include even years only.

(Source: 5)

Appendix Table 16. Commercial salmon catch in percent by gear type and district,
Bristol Bay, 1964-83. 1/

Year	Naknek- Kvichak		Egegik		Ugashik		Nushagak		Togiak		Total	
	Drift	Set	Drift	Set	Drift	Set	Drift	Set	Drift	Set	Drift	Set
1964	88	12	82	18	74	26	87	13	98	2	86	14
65	95	5	84	16	82	18	74	26	100		92	8
66	93	7	88	12	83	17	72	28	98	2	89	11
67	91	9	90	10	81	19	86	14	95	5	90	10
68	85	15	93	7	81	19	91	9	98	2	90	10
1969	91	9	80	20	82	18	83	17	99	1	89	11
70	96	4	84	16	76	24	77	23	99	1	93	7
71	92	8	87	13	89	11	82	18	100		90	10
72	94	6	90	10	46	54	93	7	100		93	7
73	89	11	89	11	84	16	94	6	99	1	93	7
1974	84	16	77	23	53	47	83	17	94	6	84	16
75	93	7	90	10	85	15	83	17	93	7	91	9
76	92	8	90	10	89	11	90	10	93	7	91	9
77	90	10	88	12	87	13	93	7	93	7	90	10
78	90	10	83	17	94	6	89	11	87	13	89	11
1979	90	10	77	23	83	17	84	16	86	14	88	1
80	89	11	71	29	88	12	87	13	86	14	86	14
81	88	12	76	24	89	11	83	17	82	18	85	15
82	86	14	81	19	84	16	87	13	86	14	86	14
83	92	8	86	14	93	7	85	15	84	16	90	10
20 Year Average	90	10	84	16	81	19	85	15	94	8	89	11
1964-73 Average	91	9	87	13	78	22	84	16	99	2	91	10
1974-83 Average	89	11	82	18	85	16	86	14	88	12	88	12

1/ All salmon species combined.

(Source: 5)

Appendix Table 17. Sockeye salmon escapement by district, in numbers of fish, Bristol Bay, 1967-86.

Year	Naknek-Kvichak 1/	Egegik 2/	Ugashik 3/	Nushagak 4/	Togiak 5/	Total
1967	4,174,474	636,864	243,930	875,452	91,330	6,022,050
68	3,774,534	338,654	70,896	976,664	56,418	5,217,166
69	9,907,896	1,015,554	160,380	1,212,586	125,066	12,421,482
70	14,844,868	919,734	735,024	1,966,156	212,896	18,678,678
71	3,510,448	634,014	529,752	1,353,382	213,242	6,240,838
1972	1,747,668	546,402	79,428	528,650	81,970	2,984,118
73	618,510	328,842	38,988	581,307	114,930	1,682,577
74	5,889,750	1,275,630	61,854	2,267,468	108,492	9,603,194
75	15,267,616	1,173,840	429,336	2,273,038	189,162	19,332,992
76	3,367,854	509,160	356,308	1,486,276	200,590	5,920,188
1977	2,527,000	692,514	201,520	1,220,056	202,634	4,843,724
78	5,192,066	895,698	82,434	3,485,532	340,076	9,995,806
79	12,437,996	1,032,042	1,706,904	3,073,571	224,838	18,475,351
80	25,447,866	1,060,860	3,335,284	8,310,438	572,450	38,726,898
81	3,632,788	694,680	1,327,699	2,850,637	365,910	8,871,714
1982	2,529,692	1,034,628	1,185,551	2,012,742	341,424	7,104,037
83	4,554,496	792,282	1,001,364	1,948,492	239,610	8,536,244
84	11,948,514	1,165,320	1,270,318	1,814,686	200,778	16,399,616
85	9,179,014	1,095,192	1,006,407	1,684,796	190,082	13,155,491
86	3,387,147	1,151,750	1,015,582	2,133,398	271,184	7,959,061
20 Year Average	7,197,010	849,683	741,948	2,102,766	217,154	11,108,561
1967-76 Average	6,310,362	737,869	270,590	1,352,098	139,410	8,810,328
1977-86 Average	8,083,658	961,497	1,213,306	2,853,435	294,899	13,406,794

1/ Includes Kvichak, Branch and Naknek Rivers.

2/ Includes King Salmon River when survey data is available.

3/ Includes Mother Goose River system 1967 and 1976-86; and Dog Salmon River system 1984-86.

4/ Includes Wood, Igushik, Nuyakuk, Nushagak-Mulchatna and Snake Rivers.

5/ Includes Togiak River, Lake and tributaries, Kulukak system and other miscellaneous river systems.

(Sources: 1 and 7)

Appendix Table 18. Inshore commercial catch and escapement of sockeye salmon in the Naknek-Kvichak District by river system, in numbers of fish, Bristol Bay, 1967-86.

Year	Catch	Escapement			Total	Total Run
		Kvichak 1/	Branch 2/	Naknek 3/		
1967	2,337,226	3,216,208	202,626	755,640	4,174,474	6,511,700
68	1,216,858	2,557,440	193,872	1,023,222	3,774,534	4,991,392
69	4,655,072	8,394,204	182,490	1,331,202	9,907,896	14,562,968
70	17,803,805	13,935,306	177,060	732,502	14,844,868	32,648,673
71	5,857,378	2,387,392	187,302	935,754	3,510,448	9,367,826
1972	1,102,365	1,009,962	151,188	586,518	1,747,668	2,850,033
73	168,249	226,554	35,280	356,676	618,510	786,759
74	538,163	4,433,844	214,848	1,241,058	5,889,750	6,427,913
75	3,085,416	13,140,450	100,480	2,026,686	15,267,616	18,353,032
76	2,547,276	1,965,282	81,822	1,320,750	3,367,854	5,915,130
1977	2,167,214	1,341,144	100,000	1,085,856	2,527,000	4,694,214
78	5,123,668	4,149,288	229,400	813,378	5,192,066	10,315,734
79	14,991,826	11,218,434	294,200	925,362	12,437,996	27,429,822
80	15,120,457	22,505,268	297,900	2,644,698	25,447,866	40,568,323
81	10,992,809	1,754,358	82,210	1,796,220	3,632,788	14,625,597
1982	5,005,802	1,134,840	239,300	1,155,552	2,529,692	7,535,4
83	21,559,372	3,569,982	96,220	888,294	4,554,496	26,113,868
84	14,237,955 3/	10,490,670	215,370	1,242,474	11,948,514	26,186,469
85	8,135,810 3/	7,211,046	118,030	1,849,938	9,179,014	17,314,824
86	2,889,894 3/	1,179,322	230,180	1,977,645	3,387,147	6,277,041
20 Year Average	6,976,831	5,791,050	171,489	1,234,471	7,197,010	14,173,841
1967-76 Average	3,931,181	5,126,664	152,697	1,031,001	6,310,362	10,241,543
1977-86 Average	10,022,481	6,455,435	190,281	1,437,942	8,083,658	18,106,139

1/ Tower count.

2/ Tower count 1967-76 and aerial survey estimates 1977-86.

3/ Preliminary.

(Sources: 1, 7 and 14)

Appendix Table 19. Inshore sockeye salmon total run by river system, Naknek-Kvichak District, Bristol Bay, 1967-86.

Year	Number of Fish in Thousands and Percent of Total Run						
	Kvichak		Branch		Naknek		Total Run 1/
	Number	%	Number	%	Number	%	
1967	5,017	77	269	4	1,225	19	6,511
68	2,945	59	255	5	1,791	36	4,991
69	12,155	83	273	2	2,135	15	14,563
70	30,517	94	407	1	1,726	5	32,650
71	6,152	66	509	5	2,706	29	9,367
1972	1,352	48	183	6	1,315	46	2,850
73	248	31	37	5	501	64	786
74	4,582	71	225	4	1,621	25	6,428
75	14,746	80	114	1	3,493	19	18,353
76	3,423	58	137	2	2,354	40	5,914
1977	2,081	44	150	3	2,463	53	4,694
78	7,965	77	455	5	1,896	18	10,316
79	24,637	90	573	2	2,219	8	27,429
80	35,248	87	561	1	4,759	12	40,568
81	6,989	48	311	2	7,326	50	14,626
1982	2,993	40	772	10	3,770	50	7,535
83	20,105	77	557	2	5,452	21	26,114
84 2/	22,783	87	537	2	2,866	11	26,186
85 2/	13,372	77	262	2	3,681	21	17,315
86 2/	1,966	31	399	6	3,913	62	6,278
20 Year Average	10,964	66	349	3	2,861	30	14,174
1967-76 Average	8,114	67	241	4	1,887	30	10,241
1977-86 Average	13,814	66	458	3	3,835	31	18,106

1/ Due to rounding of river system total runs, the district total run may not equal the actual shown on Appendix Table 19.

2/ Preliminary apportionment.

(Sources: 1 and 7)

Appendix Table 20. Inshore commercial catch and escapement of sockeye salmon in the Egegik District by river system, Bristol Bay, 1967-86.

Year	Catch	Escapement		Total Run
		Egegik 1/	King Salmon 2/	
1967	1,070,942	636,864		1,707,806
68	671,554	338,654		1,010,208
69	889,322	1,015,554		1,904,876
70	1,403,509	919,734		2,323,243
71	1,306,682	634,014		1,940,696
1972	839,820	546,042		1,385,862
73	221,337	328,842		550,179
74	172,253	1,275,630		1,447,883
75	964,024	1,173,840		2,137,864
76	1,329,788	509,160		1,838,948
1977	1,780,567	692,514		2,473,081
78	1,207,294	895,698		2,102,992
79	2,257,332	1,032,042		3,289,374
80	2,623,066	1,060,860		3,683,926
81	4,361,406	694,680		5,056,086
1982	2,447,514	1,034,628		3,482,142
83	6,775,256	792,282		7,547,538
84	5,301,198 3/	1,165,320	25	6,466,543 3/
85	7,457,295 3/	1,095,192		8,552,487 3/
86	5,008,770 3/	1,151,750	430	6,160,950 3/
20-Year Average	2,403,446	849,665		3,253,134
1967-76 Average	886,923	737,833		1,624,757
1977-86 Average	3,919,970	961,497		4,881,466

- 1/ Tower count.
2/ Aerial survey.
3/ Preliminary.

(Sources: 1 and 7)

Appendix Table 21. Inshore commercial catch and escapement of sockeye salmon in the Ugashik District by river system, Bristol Bay, 1967-86.

Year	Escapement			
	Catch	Ugashik 1/	King Salmon 2/	Dog Salmon 2/ Total Run
1967	163,744	238,830	5,100	407,674
68	82,457	70,896		153,353
69	169,845	160,380		330,225
70	171,541	735,024		906,565
71	954,068	529,752		1,483,820
1972	17,440	79,428		96,868
73	3,920	38,988		42,908
74	2,151	61,854		64,005
75	14,558	429,336		443,894
76	174,923	341,808	14,500	531,231
1977	92,623	201,486	34	294,143
78	7,995	70,434	12,000	90,429
79	391,118	1,700,904	6,000	2,098,022
80	885,875	3,321,384	13,900	4,221,159
81	2,116,066	1,326,762	937	3,443,765
1982	1,139,192	1,157,526	28,025	2,324,743
83	3,349,451	1,000,614	750	4,350,815
84	2,661,330 3/	1,241,418	17,100	3,931,648
85	6,346,489 3/	998,232	7,400	7,352,896
86	4,928,502 3/	1,001,492	4,310	5,944,084
20-Year Average	1,183,664	735,327	5,503	1,925,612
1967-76 Average	175,465	268,630	1,960	446,054
1977-86 Average	2,191,864	1,202,025	9,046	3,405,170

1/ Tower count.
2/ Aerial survey.
3/ Preliminary.

(Sources: 1 and 7)

Appendix Table 22. Inshore commercial catch and escapement of sockeye salmon in the Nushagak District by river system, in numbers of fish, Bristol Bay, 1967-86.

Year	Catch	Escapement					Total	Total Run
		Wood 1/	Igushik 1/	Nuyakuk 1/	Nush/Mul 2/	Snake 3/		
1967	657,711	515,772	281,772	20,250	46,658	11,000	875,452	1,533,163
68	749,281	649,344	194,508	96,642	32,070	4,100	976,664	1,725,945
69	773,207	604,338	512,328	69,828	16,792	9,300	1,212,586	1,985,793
70	1,188,534	1,161,964	370,920	364,648	44,824	23,800	1,966,156	3,154,690
71	1,256,799	851,202	210,960	224,382	58,336	8,500	1,353,380	2,610,179
1972	381,347	430,602	60,018	28,596	7,434	2,000	528,650	909,997
73	272,093	330,474	59,508	110,016	80,394	915	581,307	853,400
74	510,571	1,708,836	358,752	154,614	30,000	15,266	2,267,468	2,778,039
75	645,902	1,270,116	241,086	669,918	82,400	9,518	2,273,038	2,918,940
76	1,265,422	817,008	186,120	425,220	45,200	12,728	1,486,276	2,751,698
1977	619,025	561,828	95,970	232,554	320,400	9,304	1,220,056	1,839,081
78	3,137,166	2,267,238	536,154	576,666	87,400	18,074	3,485,532	6,622,698
79	3,327,346	1,706,352	859,560	360,120	139,100	8,439	3,073,571	6,400,917
80	4,497,787	2,969,040	1,987,530	3,026,568	290,800	36,500	8,310,438	12,808,225
81	7,493,093	1,233,318	591,144	834,204	177,400	14,571	2,850,637	10,343,730
1982	5,916,187	976,470	423,768	537,864	63,000	11,640	2,012,742	7,928,929
83	5,119,744	1,360,968	180,438	318,606	85,400	3,080	1,948,492	7,068,236
84	2,164,667 4/	1,002,792	184,872	472,596	120,586	33,840	1,814,686	3,979,353
85	1,323,492 4/	939,000	212,454	429,162	69,300	34,880	1,684,796	3,008,288
86	2,757,730 4/	818,652	307,728	821,898	168,340	16,780	2,133,398	4,891,128
20 Year Average	2,202,855	1,108,765	392,779	488,717	98,291	14,211	2,102,766	4,305,627
1967-76 Average	770,087	833,965	247,597	216,411	44,410	9,712	1,352,097	2,122,111
1977-86 Average	3,635,623	1,383,565	537,961	761,023	152,172	18,710	2,853,434	6,489,011

1/ Tower count.

2/ Tower counts 1967-70 and 1973-74, aerial survey estimates 1977-83 and 1985; and sonar count 1984. Tower not operated in 1971-72 and 1975-76; escapement estimates for these years and 1986 were based on the average ratio of Nuyakuk/Nushagak-Mulchatna River system in those years when data was available.

3/ Aerial survey estimate 1967-72, 1980 and 1982-86; weir count 1973-79 and 1981.

4/ Preliminary.

(Sources: 1, 7, and 13)

Appendix Table 23. Inshore sockeye salmon total run by river system, Nushagak District, Bristol Bay, 1967-86.

Year	Number of Fish in Thousands and Percent of Total Run										
	Wood		Igushik		Nuyakuk		Nush-Mul.		Snake		Total Run
	Number	%	Number	%	Number	%	Number	%	Number	%	
1967	1,046	68	300	20	53	3	123	8	11	1	1,533
68	1,056	61	439	26	168	10	59	3	4	+	1,726
69	1,056	53	752	38	129	6	39	2	9	1	1,985
70	1,758	56	671	21	604	19	97	3	24	1	3,154
71	1,438	55	619	24	432	17	113	4	9	+	2,611
1972	587	65	157	17	146	16	17	2	3	+	910
73	444	52	96	11	176	21	136	16	1	+	853
74	2,132	77	421	15	172	6	36	1	19	1	2,780
75	1,493	51	387	13	889	30	133	5	17	1	2,919
76	1,443	52	328	12	856	31	101	4	24	1	2,752
1977	825	45	149	8	365	20	486	26	13	1	1,838
78	4,059	61	1,075	16	1,262	19	194	3	33	1	6,623
79	3,544	55	1,814	28	743	12	282	5	18	+	6,401
80	4,488	35	3,072	24	4,720	37	473	4	55	+	12,808
81	4,251	41	2,314	22	3,076	30	654	6	48	+	10,343
1982	3,713	47	1,837	23	2,305	29	63	1	12	+	7,930
83	4,388	62	873	12	1,719	24	85	1	3	+	7,068
84 2/	2,186	55	439	11	1,020	26	259	6	75	2	3,979
85 2/	1,720	57	390	13	794	26	69	2	35	1	3,008
86 2/	1,823	37	939	19	1,944	40	168	3	17	+	4,891
20 Year Average	2,172	50	853	20	1,078	25	179	4	21	+	4,305
1967-76 Average	1,245	59	417	20	362	17	85	4	12	+	2,122
1977-86 Average	3,099	48	1,290	20	1,794	28	273	4	30	+	6,488

1/ Due to rounding of river system total runs, the district total run may not equal the actual shown on Appendix Table 22.

2/ Preliminary apportionment.

(Sources: 1 and 7)

Appendix Table 24. Inshore commercial catch and escapement of sockeye salmon in the Togiak District by river system, Bristol Bay, 1967-86.

Year	Number of Fish									
	Catch				Escapement					
					Togiak		Tribu- taries 4/	Kulukak 5/	Total	Total Run
	Togiak	Kulukak	Os/Mat 1/	Total	Lake 2/	River 3/				
1967	71,512	24,379	5,216 6/	101,107	69,330		12,000	10,000	91,330	192,437
68	65,475	2,618	4,606	72,699	42,918		7,000	6,500	56,418	129,117
69	129,615	3,411	1,226	134,252	109,266		7,400	8,400	125,066	259,318
70	152,748		629	153,377	192,096		10,800	10,000	212,896	366,273
71	200,507	7,927	626	209,060	190,842		9,400	13,000	213,242	422,302
1972	51,354	17,244	6,663	75,261	74,070		4,500	3,400	81,970	157,231
73	75,694	15,551	4,478	95,723	95,730		11,200	8,000	114,930	210,653
74	110,886	13,615	14,840	139,341	82,992	12,000	8,600	4,900	108,492	247,833
75	184,856	3,821	237	188,914	160,962	12,200	7,400	8,600	189,162	378,076
76	293,016	4,822	4,045	301,883	158,190	15,000	16,200	11,200	200,590	502,473
1977	201,004	16,252	1,195	218,451	133,734	4,400	24,400	40,100	202,634	421,085
78	422,100	29,668	248 6/	452,016	273,576	15,000	17,600	33,900	340,076	792,092
79	393,337	66,629	1,018	460,984	171,138	14,200	12,900	26,600	224,838	685,822
80	591,470	42,811	280	634,561	461,850	27,900	37,000	45,700	572,450	1,207,011
81	620,288	19,246	173	639,707	208,080	21,150	77,900	58,780	365,910	1,005,617
1982	581,718	13,952	26	595,696	244,824	3,450	40,400	52,750	341,424	937,120
83	529,775	55,906	2,527	588,208	191,520	7,200	13,920	26,970	239,610	827,818
84	210,930	95,583	12,350	318,863 7/	95,448	15,830	39,700	49,800	200,778	519,641
85	131,391	45,149	33,930	210,470 7/	136,542	3,600	13,340	36,600	190,082	400,552
86	192,285	93,896	17,496	303,677 7/	168,384	20,000	15,000	42,800	246,184	549,861
20 Year Average 8/	260,498	30,131	5,590	294,713	163,075	13,225	19,333	24,900	215,904	510,617
1967-76 Average	133,566	10,376	4,257	147,162	117,640	13,067	9,450	8,400	139,410	286,571
1977-86 Average	387,430	47,909	6,924	442,263	208,510	13,273	29,216	41,400	292,399	734,662

1/ Catches in the Osviak and Matogak sections were combined.

2/ Tower count.

3/ Aerial survey estimate.

4/ Aerial survey estimate includes Gechiak, Pungokebuk, Ongivinuck, Ungalikthluk/Kukayachagak, and other miscellaneous river systems.

5/ Aerial survey estimate includes Kulukak River and Lake and Tithe Creek ponds.

6/ Includes 25 fish from Cape Peirce section in 1967 and 248 fish in 1978.

7/ Preliminary.

8/ Only years and systems with catch/escapement data were included in calculating averages.

(Sources: 1, 7, and 13)

Appendix Table 25. Inshore total run of sockeye salmon by district, in numbers of fish, Bristol Bay, 1967-86.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1967	6,511,700	1,707,806	407,674	1,533,163	192,437	10,352,780
68	4,991,392	1,010,208	153,353	1,725,945	129,117	8,010,015
69	14,562,968	1,904,876	330,225	1,985,793	259,318	19,043,180
70	32,648,673	2,323,243	906,565	3,154,690	366,273	39,399,444
71	9,367,826	1,940,696	1,483,820	2,610,181	422,302	15,824,825
1972	2,850,033	1,386,222	96,868	909,997	157,231	5,400,351
73	786,759	550,179	42,908	853,400	210,653	2,443,899
74	6,427,913	1,447,883	64,005	2,778,039	247,833	10,965,673
75	18,353,032	2,137,864	443,894	2,918,940	378,076	24,231,806
76	5,915,130	1,838,948	531,231	2,751,698	502,473	11,539,480
1977	4,694,214	2,473,081	294,143	1,839,081	421,085	9,721,604
78	10,315,734	2,102,992	90,429	6,622,698	792,092	19,923,945
79	27,429,822	3,289,374	2,098,022	6,400,917	685,822	39,903,957
80	40,568,323	3,683,926	4,221,159	12,808,225	1,207,011	62,488,644
81	14,625,597	5,056,086	3,443,765	10,343,730	1,005,617	34,474,795
1982	7,535,494	3,482,142	2,324,743	7,925,929	937,120	22,205,428
83	26,113,868	7,547,538	4,350,815	7,068,236	827,818	45,908,275
84 1/	26,186,469	6,466,518	3,931,648	3,979,353	519,641	41,083,629
85 1/	17,314,824	8,552,487	7,352,896	3,008,288	400,552	36,629,047
86 1/	6,277,041	6,160,529	5,944,084	4,891,128	574,861	23,847,643
20 Year Average	14,173,841	3,253,130	1,925,612	4,305,472	511,867	24,169,921
1967-76 Average	10,241,543	1,624,793	446,054	2,122,185	286,571	14,721,145
1977-86 Average	18,106,139	4,881,467	3,405,170	6,488,759	737,162	33,618,697

1/ Preliminary.

(Sources: 1, 7, and 17)

Appendix Table 26. Comparisons of inshore sockeye salmon forecasts versus actual runs, and escapement goals versus actual escapements for the Kvichak and Naknek River systems, in thousands of fish, Bristol Bay, 1967-86.

Year	Kvichak River						Naknek River					
	Inshore Run			Escapement			Inshore Run			Escapement		
	Forecast	Actual	Percent	Goal	Actual	Percent	Forecast	Actual	Percent	Goal	Actual	Percent
			Error 1/			Deviation 1/			Error 1/			Deviation 1/
1967	3,993	5,017	- 20	3,500	3,216	9	2,564	1,225	109	1,000	756	32
68	874	2,945	- 70	874	2,557	- 66	2,295	1,791	28	1,000	1,023	- 2
69	12,780	12,155	5	6,000	8,394	- 29	2,741	2,135	28	1,000	1,331	- 25
70	43,732	30,517	43	19,000	13,935	36	2,904	1,726	68	1,000	733	36
71	6,349	6,152	3	2,500	2,387	5	2,189	2,706	- 19	900	936	- 4
1972	3,859	1,352	185	2,000	1,010	98	1,446	1,315	10	800	587	36
73	2,396	248	866	2,000	227	781	936	501	87	800	357	124
74	3,029	4,582	- 34	6,000	4,434	35	647	1,621	- 60	800	1,241	- 36
75	6,338	14,746	- 57	14,000	13,140	7	1,144	3,493	- 67	800	2,027	- 61
76	4,593	3,423	34	2,000	1,965	2	1,883	2,354	- 20	900	1,321	- 39
1977	2,269	2,081	9	2,000	1,341	49	2,097	2,463	- 15	800	1,086	- 26
78	5,089	7,965	- 36	2,000	4,149	- 52	1,697	1,896	- 10	800	813	- 2
79	12,349	24,637	- 50	6,000	11,218	- 47	1,744	2,219	- 21	800	925	- 14
80	40,064	35,248	14	14,000	22,505	- 38	2,703	4,759	- 43	800	2,665	- 70
81	10,419	6,989	49	2,000	1,754	14	3,345	7,326	- 54	800	1,796	- 55
1982	13,079	2,993	337	2,000	1,135	76	3,812	3,770	1	800	1,156	- 31
83	9,738	20,105	- 52	2,000	3,570	- 44	2,944	5,452	- 46	800	888	- 10
84 2/	16,704	22,783	- 27	10,000	10,491	- 5	2,984	2,866	4	1,000	1,242	- 19
85 2/	12,182	13,372	- 9	10,000	7,211	39	4,868	3,681	32	1,000	1,850	- 46
86 2/	4,463	1,966	127	5,000	1,179	324	3,178	3,913	- 19	1,000	1,978	- 49
20 Year Average	10,715	10,964	66	5,644	5,791	60	2,406	2,861	0	875	1,236	- 13
1967-76 Average	8,794	8,114	96	5,787	5,127	88	1,875	1,887	16	890	1,031	6
1977-86 Average	12,636	13,814	36	5,500	6,455	32	2,937	3,835	- 17	860	1,440	- 32

1/ Percent Error = (Forecast minus actual)/actual (multiplied by 100).

2/ Preliminary catch apportionment.

(Sources: 1 and 7)

Appendix Table 27. Comparisons of inshore sockeye salmon forecasts versus actual runs, and escapement goals versus actual escapements for the Egegik and Ugashik River systems, in thousands of fish, Bristol Bay, 1967-86.

Year	Egegik River							Ugashik River						
	Inshore Run			Escapement				Inshore Run			Escapement 1/			
	Forecast	Actual	Percent	Goal	Actual	Percent	Error 2/	Forecast	Actual	Percent	Goal	Actual	Percent	Error 2/
			Error 2/			Deviation 2/				Error 2/			Deviation 2/	
1967	2,381	1,708	39	1,000	637	57		933	403	132	850	244	248	
68	2,093	1,010	107	1,000	339	195		1,050	153	586	750	71	956	
69	1,972	1,905	4	700	1,016	- 31		712	330	116	400	160	150	
70	4,050	2,323	74	1,000	920	9		1,252	907	38	700	735	- 5	
71	2,113	1,941	9	600	634	- 5		1,150	1,484	- 23	500	530	- 6	
1972	1,575	1,386	14	600	546	10		265	97	173	450	79	470	
73	1,009	550	83	500	329	52		188	43	337	188	39	382	
74	169	1,448	- 88	600	1,276	- 53		90	64	41	500	62	706	
75	1,400	2,138	- 35	600	1,174	- 49		259	444	- 42	500	429	17	
76	1,357	1,839	- 26	600	509	18		689	517	33	500	356	40	
1977	1,607	2,473	- 35	600	693	- 13		257	294	- 13	500	202	148	
78	1,524	2,103	- 28	600	896	- 33		247	78	217	500	82	510	
79	2,171	3,289	- 34	600	1,032	- 42		983	2,092	- 53	500	1,707	- 71	
80	3,445	3,684	- 6	600	1,061	- 43		1,488	4,207	- 65	500	3,335	- 85	
81	3,173	5,056	- 37	600	695	- 14		3,029	3,443	- 12	500	1,328	- 62	
1982	4,236	3,482	22	600	1,035	- 42		2,065	2,297	- 10	500	1,186	- 58	
83	3,415	7,548	- 55	600	792	- 24		4,177	4,350	- 4	500	1,001	- 50	
84 3/	3,541	6,467	- 45	1,000	1,165	- 14		1,916	3,903	- 51	700	1,270	- 45	
85 3/	6,590	8,552	- 23	1,000	1,095	- 9		5,621	7,345	- 23	700	1,006	- 30	
86 3/	5,416	6,160	- 12	1,000	1,152	- 13		4,896	5,930	- 17	700	1,016	- 31	
20 Year Average	2,662	3,253	- 4	720	850	- 2		1,563	1,919	68	547	742	159	
1967-76 Average	1,812	1,625	18	720	738	20		659	444	139	534	271	296	
1977-86 Average	3,512	4,881	- 25	720	962	- 25		2,468	3,394	- 3	560	1,213	22	

1/ Includes Mother Goose Lake and Dog Salmon River.

2/ Percent Error = (forecast minus actual)/actual (multiplied by 100).

3/ Preliminary catch apportionment.

(Sources: 1 and 7)

Appendix Table 28. Comparisons of inshore sockeye salmon forecasts versus actual runs, and escapement goals versus actual escapements for the Wood and Igushik River systems, in thousands of fish, Bristol Bay, 1967-86.

Year	Wood River						Igushik River					
	Inshore Run			Escapement			Inshore Run			Escapement		
	Forecast	Actual	Percent Error 1/	Goal	Actual	Percent Deviation 1/	Forecast	Actual	Percent Error 1/	Goal	Actual	Percent Deviation 1/
1967	2,484	912	172	1,100	516	113	153	504	- 70	153	282	- 46
68	2,536	1,142	122	1,000	649	54	272	336	- 19	150	195	- 23
69	1,618	993	63	750	604	24	424	831	- 49	200	512	- 61
70	1,865	1,806	3	1,000	1,162	- 14	680	617	10	200	371	- 46
71	1,644	1,607	2	750	851	- 12	565	439	29	150	211	- 29
1972	1,414	718	97	750	431	74	422	117	261	150	60	150
73	779	479	63	700	330	112	320	87	268	150	60	150
74	399	2,099	- 81	800	1,709	- 53	73	442	- 83	150	359	- 58
75	1,497	1,640	- 9	800	1,270	- 37	445	319	39	150	241	- 38
76	1,205	1,438	- 16	800	817	- 2	324	345	- 6	150	186	- 19
1977	958	834	15	800	562	42	408	146	179	150	96	56
78	1,720	4,117	- 58	800	2,267	- 65	243	1,084	- 78	150	536	- 72
79	2,579	3,638	- 29	800	1,706	- 53	857	1,842	- 53	150	860	- 83
80	2,338	4,529	- 48	800	2,969	- 73	1,425	3,126	- 54	150	1,988	- 92
81	2,336	4,568	- 49	800	1,233	- 35	1,994	2,229	- 11	150	591	- 75
1982	4,900	3,713	32	800	976	- 18	1,827	1,837	- 1	150	424	- 65
83	3,256	4,388	- 26	1,000	1,361	- 27	640	873	- 27	200	180	11
84 2/	2,666	2,258	18	1,000	1,003	0	837	447	87	200	185	8
85 2/	2,234	1,720	36	1,000	939	6	307	390	- 21	200	212	- 6
86 2/	1,701	1,823	- 7	800 3/	819	- 2	703	939	- 25	200	308	- 35
20 Year Average	2,011	2,221	15	853	1,109	2	646	848	19	165	393	- 19
1967-76 Average	1,544	1,283	42	845	834	26	368	404	38	160	248	- 2
1977-86 Average	2,479	3,159	- 12	860	1,384	- 22	924	1,291	0	170	538	- 35

1/ Percent Error = (Forecast minus actual)/actual (multiplied by 100).

2/ Preliminary catch apportionment.

3/ Although the published escapement goal for this river is 1 million, Department policy states that inseason adjustment of the goal may be necessary to compensate for an imbalanced 2-ocean/3-ocean proportion in age composition. The policy is designed to maximize productivity of the spawning grounds.

(Sources: 1 and 7)

Appendix Table 29. Comparisons of inshore sockeye salmon forecasts versus actual runs, and escapement goals versus actual escapement, for the Nuyakuk and Togiak River systems, in thousands of fish, Bristol Bay, 1967-86.

Year	Nuyakuk River						Togiak River					
	Inshore Run			Escapement			Inshore Run			Escapement		
	Forecast	Actual	Percent	Goal	Actual	Percent	Forecast	Actual	Percent	Goal	Actual	Percent
			Error 2/			Deviation 2/			Error 2/			Deviation 2/
1967	128	60	113	80	20	300	180	153	18	90	69	30
68	400	182	120	200	97	106	222	115	93	110	43	156
69	334	118	183	150	70	114	180	246	- 27	100	109	- 8
70	400	613	- 35	214	365	- 41	272	356	- 24	100	192	- 48
71	293	498	- 41	132	224	- 41	363	401	- 9	115	191	- 40
1972	137	65	111	71	29	145	126	130	- 3	70	74	- 5
73	166	162	2	150	110	36	119	183	- 35	80	96	- 17
74	158	187	- 16	250	155	61	297	215	38	100	83	20
75	320	868	- 63	250	670	- 63	178	365	- 51	100	161	- 38
76	506	845	- 40	250	425	- 41	273	482	- 43	100	158	- 37
1977	249	358	- 30	250	233	7	255	364	- 30	100	134	- 25
78	310	1,302	- 76	250	577	- 57	289	728	- 60	100	274	- 64
79	786	764	3	250	360	- 31	467	592	- 21	100	171	- 42
80	2,167	4,826	- 55	250	3,027	- 92	531	1,118	- 53	100	462	- 78
81	1,192	3,318	- 64	250	834	- 70	647	927	- 30	100	208	- 52
1982	2,603	2,305	13	250	538	- 54	937	870	8	100	245	- 59
83	1,586	1,719	- 8	300	319	- 6	589	742	- 21	100	192	- 48
84 3/	1,560	1,111	40	500	473	6	453	362	25	150	95	58
85 3/	1,706	794	115	500	429	17	949	277	243	150	145	3
86 3/	1,437	1,944	- 26	500	822	- 39	521	395	32	150	168	- 11
20 Year Average	822	1,102	12	252	489	13	392	451	2	106	164	- 15
1967-76 Average	284	360	33	175	217	58	221	265	- 4	97	118	1
1977-86 Average	1,360	1,844	- 9	330	761	- 32	564	638	9	115	209	- 32

1/ Does not include Togiak River and tributaries.

2/ Percent Error = (Forecast minus actual)/actual (multiplied by 100).

3/ Preliminary catch apportionment.

(Sources: 1 and 7)

Appendix Table 30. Kvichak River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-86. 1/

Brood Year	Escapement	Return by Age Group					Total	Return Per Spawner 2/
		3	4	5	6	7		
1956	9,433	14	24,280	13,425	1,308		39,027	4.13
57	2,843	8	243	3,577	261	2	4,090	1.44
58	535		77	183	26	3	289	0.54
59	680		213	323	11		546	0.80
60	14,630		1,449	47,306	6,493	6	55,255	3.78
1961	3,706	1	334	2,483	684		3,502	0.95
62	2,581		106	4,825	420	4	5,356	2.08
63	339		52	689	369	9	1,120	3.31
64	957	8	2,337	2,748	655	3	5,751	6.01
65	24,326	25	10,337	33,421	1,240	1	45,024	1.85
1966	3,775	15	513	5,347	385	1	6,261	1.66
67	3,216		356	1,084	87		1,527	0.47
68	2,557		293	112	137	2	543	0.21
69	8,394		137	4,543	613	11	5,303	0.63
70	13,935	1	83	14,480	1,261	7	15,833	1.14
1971	2,387		263	2,263	305		2,830	1.19
72	1,010		256	1,365	319		1,941	1.92
73	227		580	1,303	574		2,457	10.85
74	4,434	9	6,639	18,734	793	5	26,180	5.90
75	13,140	5	5,984	31,495	601		38,086	2.90
1976	1,965	5	5,352	4,941	277		10,575	5.38
77	1,341	54	1,941	1,140	99		3,235	2.41
78	4,149		1,851	2,474	845	6	5,176	1.25
79	11,218	58	18,406	19,882	3,486		41,832	3.73
80	22,505	2	2,944	9,710	415		(13,071)	(0.58)
1981	1,754		820	1,161			(1,981)	(1.13)
82	1,135	23	448				(471)	(0.41)
83	3,570	1					(1)	(0.00)
84	10,491							
85	7,211							
1986	1,179							
Average 3/	5,491	8	3,420	9,089	885	3	13,406	2.44
Percent		0	26	68	7	0	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish. Totals differ from those previously reported due to inclusion here of Bristol Bay fish harvested at False Pass.

2/ Returns in parentheses incomplete.

3/ Averages and percentages computed from 1956-79.

(Sources: 1 and 18)

Appendix Table 31. Branch River sockeye salmon escapement and return by brood year, 1956-86. 1/

Brood Year	Escapement	Return by Age Group						Return Per Spawner 2/
		3	4	5	6	7	Total	
1956	784	5	1,885	458	41		2,389	3.05
57	127		5	66	13	1	85	0.67
58	95		43	53	52		148	1.56
59	825		301	387	76	2	766	0.93
60	1,241		105	320	31		456	0.37
1961	90	10	90	192	0		292	3.24
62	91	19	129	94	19		261	2.87
63	203		200	174	2		376	1.85
64	249	5	102	211	17		335	1.35
65	175	6	104	171	17		298	1.70
1966	174	13	282	274	11		580	3.33
67	203	9	301	97	7		414	2.04
68	194	8	127	43	3		181	0.93
69	182		5	160	25		190	1.04
70	177		73	77	2		152	0.86
1971	187	2	26	59	37	2	126	0.67
72	151	1	91	24	14		130	0.86
73	35		98	148	2		248	7.09
74	215	4	297	146	8		455	2.12
75	100	15	415	343	2		775	7.75
1976	82	26	211	188	55		480	5.85
77	100	27	142	699	12		880	8.80
78	229	1	102	107	142		333	1.45
79	294	3	464	317	3		787	2.68
80	298		102	220	11		(333)	(1.12)
1981	82		56	223			(279)	(3.40)
82	239		173				(173)	(0.72)
83	96							
84	215							
85	118							
1986	230							
Average 3/	258	6	233	200	25	0	464	1.80
Percent		1	50	43	5	0	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to nearest thousand fish. Totals differ from those previously reported due to inclusion here of Bristol Bay fish harvested at False Pass.

2/ Returns in parentheses incomplete.

3/ Averages and percentages computed from 1956-79.

(Sources: 1, 14, and 18)

Appendix Table 32. Naknek River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-86. 1/

Brood Year	Escapement	Return by Age Group					Total	Return Per Spawner 2/
		3	4	5	6	7		
1956	1,773	1	474	1,703	321	1	2,500	1.41
57	635		55	834	678	3	1,570	2.47
58	278		116	749	172	2	1,039	3.74
59	2,232		355	1,093	704		2,152	0.96
60	828	1	1,418	1,322	1,279	3	4,023	4.86
1961	351		242	1,060	642	8	1,952	5.56
62	723		80	581	412	1	1,074	1.49
63	905		145	1,223	634	1	2,003	2.21
64	1,350	1	472	1,399	188	1	2,061	1.53
65	718	5	584	1,093	438	1	2,121	2.95
1966	1,016	5	731	2,471	630	1	3,838	3.78
67	756		334	1,026	356	1	1,717	2.27
68	1,023	3	152	317	271	2	745	0.73
69	1,331		50	1,283	1,214	3	2,550	1.92
70	733	1	173	2,163	382		2,719	3.71
1971	936	1	422	1,987	1,847	17	4,274	4.57
72	587	3	248	402	611	1	1,265	2.16
73	357		494	1,143	598		2,235	6.26
74	1,241	2	235	1,254	789	5	2,285	1.84
75	2,027	1	436	3,139	1,642	8	5,226	2.58
1976	1,321	4	1,087	5,624	1,513	29	8,257	6.25
77	1,086	12	642	2,362	464	6	3,486	3.21
78	813	1	335	2,814	525		3,675	4.52
79	925	4	2,443	1,731	419	3	4,600	4.97
80	2,645	1	725	2,667	837		(4,230)	(1.60)
1981	1,796	4	804	3,038			(3,846)	(2.14)
82	1,156	3	189				(192)	(0.17)
83	888							
84	1,242							
85	1,850							
1986	1,979							
Average 3/	998	2	488	1,616	697	4	2,807	2.81
Percent		0	17	58	25	0	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish. Totals differ from those previously reported due to inclusion here of harvest data from Bristol Bay fish harvested at False Pass.

2/ Returns in parentheses incomplete.

3/ Averages and percentages computed from 1956-79.

(Sources: 1 and 18)

Appendix Table 33. Egegik River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-86. 1/

Brood Year	Escapement	Return by Age Group					Total	Return Per Spawner 2/
		3	4	5	6	7		
1956	1,104	6	2,026	4,110	687	12	6,841	6.20
57	391		37	1,139	996	62	2,234	5.71
58	246		45	890	324	3	1,262	5.13
59	1,072		75	1,201	481	25	1,782	1.66
60	1,799	8	469	4,775	2,609	51	7,912	4.40
1961	702		85	675	819	10	1,589	2.26
62	1,027		22	1,019	403	30	1,474	1.44
63	998		18	652	581	7	1,258	1.26
64	850	1	132	1,524	315	12	1,984	2.33
65	1,445		139	2,088	854	21	3,102	2.15
1966	804		251	1,352	898	10	2,511	3.12
67	637		64	922	624	3	1,613	2.53
68	339		41	143	260	14	458	1.35
69	1,016		13	1,208	1,418	115	2,754	2.71
70	920		59	885	270	25	1,239	1.35
1971	634		46	1,586	1,044	56	2,732	4.31
72	546		60	1,570	1,311	18	2,959	5.42
73	329		76	713	887	4	1,680	5.11
74	1,276		149	2,324	550	3	3,026	2.37
75	1,174		158	2,692	810	3	3,663	3.12
1976	509	2	674	3,792	850		5,318	10.45
77	693	2	824	2,648	720	13	4,207	6.07
78	896		406	6,587	2,249	12	9,254	10.33
79	1,032	3	721	3,624	1,642		5,990	5.80
80	1,061	1	857	6,746	953		(8,557)	(8.07)
1981	695		613	4,349			(4,962)	(7.14)
82	1,035	4	1,031				(1,035)	(1.00)
83	792	3					(3)	(0.00)
84	1,165							
85	1,095							
1986	1,151							
Average 3/	852	1	275	2,005	900	21	3,202	3.76
Percent		0	9	63	28	1	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish. Totals differ from those previously reported due to inclusion here of harvest data from Bristol Bay fish harvested at False Pass.

2/ Returns in parentheses incomplete.

3/ Averages and percentages computed from 1956-79.

(Sources: 1 and 18)

Appendix Table 34. Ugashik River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-86. 1/

Brood Year	Escapement	Return by Age Group					Total	Return Per Spawner 2/
		3	4	5	6	7		
1956	425	13	3,167	916	37		4,133	9.72
57	215		38	459	105	2	604	2.81
58	280		64	549	66		679	2.43
59	219		18	347	132	1	498	2.27
60	2,341		685	1,859	487	1	3,032	1.30
1961	366		245	747	121		1,113	3.04
62	274		81	315	28		424	1.55
63	397		13	112	23		148	0.37
64	483		41	262	19	2	324	0.67
65	998		87	287	164		538	0.54
1966	715	1	725	1,568	22		2,316	3.24
67	244		56	94	34		184	0.75
68	71		14	22	3		39	0.55
69	160		4	58	28	2	92	0.58
70	735		5	258	30	1	294	0.40
1971	530		178	511	131	1	821	1.55
72	79		34	177	37	3	251	3.18
73	39		17	22	50		89	2.28
74	62		20	615	85		720	11.61
75	429	3	1,483	2,288	327	1	4,102	9.56
1976	356		2,080	2,774	438	3	5,295	14.87
77	202	2	604	1,854	202	5	2,667	13.20
78	82		256	1,276	528		2,060	25.12
79	1,707	19	3,083	2,292	568	5	5,967	3.50
80	3,335	1	1,244	5,581	850		(7,676)	(2.30)
1981	1,328	2	1,592	4,835			(6,429)	(4.84)
82	1,186	1	439				(440)	(0.37)
83	1,001							
84	1,270							
85	1,006							
1986	1,015							
Average 3/	475	2	542	819	153	1	1,516	3.19
Percent		0	36	54	10	0	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish. Totals differ from those previously reported due to inclusion here of harvest data from Bristol Bay fish harvested at False Pass.

2/ Returns in parentheses incomplete.

3/ Averages and percentages computed from 1956-79.

(Sources: 1 and 18)

Appendix Table 35. Wood River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-86. 1/

Brood Year	Escapement	Return by Age Group						Return Per Spawner 2/
		3	4	5	6	7	Total	
1956	773		822	650			1,472	1.90
57	289		177	291			468	1.62
58	960	1	2,146	463	32		2,642	2.75
59	2,209		988	757	56	2	1,803	0.82
60	1,016	6	1,474	1,146	108		2,734	2.69
1961	461		266	1,209	21	1	1,497	3.25
62	874	2	994	459	49		1,504	1.72
63	721		537	844	46		1,427	1.98
64	1,076	1	458	685	74	2	1,220	1.13
65	675	3	481	1,089	213	1	1,787	2.65
1966	1,209	7	1,004	1,034	76	1	2,122	1.76
67	516	3	663	344	82		1,092	2.12
68	649	1	514	570	23		1,108	1.71
69	604		61	646	126		833	1.38
70	1,162	2	1,539	1,235	26		2,802	2.41
1971	851	3	475	774	50		1,302	1.53
72	431	4	801	663	46		1,514	3.51
73	330	2	213	1,223	48		1,486	4.50
74	1,709	3	2,965	2,119	76		5,163	3.02
75	1,270	60	1,606	2,383	735		4,784	3.77
1976	817	3	2,281	3,162	316		5,762	7.05
77	562	20	1,028	2,441	27		3,516	6.26
78	2,267		1,363	1,798	127		3,288	1.45
79	1,706	10	2,773	1,740	21		4,544	2.66
80	2,969	3	496	1,173	103		(1,775)	(0.60)
1981	1,233		633	1,268			(1,901)	(1.54)
82	976	3	503				(506)	(0.52)
83	1,361	1					(1)	(0.00)
84	1,003							
85	939							
1986	819							
Average 3/	964	5	1,068	1,155	99	0	2,328	2.41
Percent		0	46	50	4	0	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish. Totals differ from those previously harvested due to inclusion her of harvest data from Bristol Bay fish harvested at False Pass.

2/ Returns in parentheses incomplete.

3/ Averages and percentages computed from 1956-79.

APPENDIX TABLE 30. Igushik River sockeye salmon escapement and return by brood year, 1956-86. 1/

Brood Year	Escapement	Return by Age Group					Total	Return Per Spawner 2/
		3	4	5	6	7		
1956	400		169	534	39		742	1.86
57	130		2	54	20		76	0.58
58	107		15	91	28		134	1.25
59	644		101	248	22		371	0.58
60	495		62	355	57		474	0.96
1961	294		34	386	17		437	1.49
62	16		28	290	9		327	20.44
63	92		257	225	25		507	5.51
64	129		163	718	49		930	7.21
65	181		371	638	79		1,088	6.01
1966	206		66	390	15		471	2.29
67	282		59	103	12		174	0.62
68	195		43	121	12		176	0.90
69	512		1	432	104		537	1.05
70	371		27	211	71		309	0.83
1971	211		48	225	30		303	1.44
72	60		93	115	21		229	3.82
73	60		19	676	30		725	12.08
74	359		449	1,096	29		1,574	4.38
75	241		783	2,693	505		3,981	16.52
1976	186		554	1,605	247		2,406	12.94
77	96		300	1,736	16		2,052	21.38
78	536		62	445	16		523	0.98
79	860		456	437	4		897	1.04
80	1,988		15	268	60		(343)	(0.17)
1981	591		143	858			(1,001)	(1.69)
82	424		54				(54)	(0.13)
83	180							
84	185							
85	212							
1986	308							
Average 3/	278		173	576	61		810	2.92
Percent			21	71	7		100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish. Totals differ from those previously harvested due to inclusion here of harvest data from Bristol Bay fish harvested at False Pass.

2/ Returns in parentheses incomplete.

3/ Averages and percentages computed from 1956-79.

(Source: 1 and 18)

Appendix Table 37. Nuyakuk River sockeye salmon escapement and return by brood year, 1956-86. 1/

Brood Year	Escapement	Return by Age Group						Return Per Spawner 2/
		3	4	5	6	7	Total	
1956	30		217	162			379	12.63
57	67		4	13	1		18	0.27
58	196		93	338	11		442	2.26
59	49		71	60	9		140	2.86
60	146	5	154	403	12		574	3.93
1961	80	1	74	319	1		395	4.94
62	38		21	37	2		60	1.58
63	167		29	197	6		232	1.39
64	103	2	18	65	2		87	0.84
65	203		79	639	61		779	3.84
1966	161	1	123	531	7		662	4.11
67	20	1	11	64	7		83	4.15
68	97		20	211	7		238	2.45
69	70	2	27	95	9		133	1.90
70	365		99	877	93		1,069	2.93
1971	224	1	104	813	41	1	960	4.29
72	29		59	309	167		535	18.45
73	110		50	1,104	2		1,156	10.51
74	155		117	256			373	2.41
75	670	7	531	4,621	247	1	5,407	8.07
1976	425	4	432	2,999	311		3,746	8.81
77	233		342	2,130	213		2,685	11.52
78	577		123	1,175	16		1,314	2.28
79	360	1	421	1,031	6		1,459	4.05
80	3,027	1	126	582	148		(857)	(0.28)
1981	834		255	1,765			(2,020)	(2.42)
82	538	2	100				(102)	(0.19)
83	319							
84	473							
85	429							
1986	822							
Average 3/	191	1	134	769	51		955	5.01
Percent			14	80	5		100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish. Totals differ from those previously reported due to inclusion here of harvest data from Bristol Bay fish harvested at False Pass.

2/ Returns in parentheses incomplete.

3/ Averages and percentages computed from 1956-79.

(Sources: 1 and 18)

Appendix Table 38. Togiak River sockeye salmon escapement and return by brood year, 1956-86. 1/

Brood Year	Escapement	Return by Age Group					Total	Return Per Spawner 3/
		3	4	5	6	7		
1956	225		107	328	14		449	2.00
57	25	2	58	90	37		187	7.48
58	72	2	71	173	25		271	3.76
59	210		142	147	7		296	1.41
60	192		194	299	52		545	2.84
1961	122	1	88	231	20		340	2.79
62	62		55	107	8		170	2.74
63	116		44	84	24		152	1.31
64	105		44	125	6		175	1.67
65	96		156	212	37		405	4.22
1966	104	1	205	424	11	1	642	6.17
67	81	1	24	115	41		181	2.23
68	50		50	196	16		262	5.24
69	117		33	167	16		216	1.85
70	203		55	282	71	1	409	2.01
1971	200		111	379	69	2	561	2.81
72	79	1	95	172	101		369	4.67
73	107	1	161	409	15		586	5.48
74	104		258	343	48	1	650	6.25
75	181		258	935	58		1,251	6.91
1976	189		190	682	166		1,038	5.49
77	163		256	650	15		921	5.65
78	306	1	154	500	19		674	2.20
79	198	2	267	317	6		592	2.99
80	527		43	238	11		(292)	(0.55)
1981	307		52	299			(351)	(1.14)
82	270		96				(96)	(0.36)
83	205							
84	126							
85	145							
1986	203							
Average 3/	138	1	128	307	37		473	3.43
Percent			27	65	8		100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish. Totals differ from those previously reported due to inclusion here of harvest data from Bristol Bay fish harvested at False Pass.

2/ Returns in parentheses incomplete.

3/ Averages and percentages computed from 1956-1979.

(Sources: 1, 13, and 18)

Appendix Table 39. Inshore commercial catch and escapement of king salmon in the Nushagak and Togiak Districts, in numbers of fish, Bristol Bay, 1967-86. 1/

Year	Nushagak District			Togiak District		
	Catch	Escapement	Total Run	Catch	Escapement	Total Run
1967	96,240	65,000 2/	161,240	13,381	10,000	23,381
68	78,201	70,000	148,201	13,499	16,000	29,499
69	80,803	35,000	115,803	20,181	8,000	28,181
70	87,547	50,000	137,547	28,664	15,000	43,664
71	82,769	40,000 3/	122,769	27,026	20,000	47,026
1972	46,045	25,000	71,045	19,976	14,000	33,976
73	30,470	35,000	65,470	10,856	11,000	21,856
74	32,053	70,000	102,053	10,798	15,000	25,798
75	21,454	70,000	91,454	7,226	11,000	18,226
76	60,684	100,000	160,684	29,744	14,000	43,744
1977	85,074	65,000	150,074	35,218	20,000	55,218
78	118,548	130,000	248,548	57,000	40,000	97,000
79	157,321	95,000	252,321	30,022	20,000	50,022
80	64,958	141,000	205,958	12,543	12,000	24,543
81	193,461	150,000	343,461	23,911	27,000	50,911
1982	195,287	147,000	342,287	33,786	17,000	50,786
83	137,123	162,000	299,123	38,497	22,000	60,497
84	61,124 4/	81,000	142,124	21,920 4/	26,000	47,920
85	67,623 4/	72,000	139,623	37,355 4/	14,000	51,355
86	63,859 4/	33,000	96,859	19,895 4/	8,000	27,895
20 Year Average	88,032	81,800	169,832	24,575	17,000	41,575
1967-76 Average	61,627	56,000	117,627	18,135	13,400	31,535
1977-86 Average	114,438	107,600	222,038	31,015	20,600	51,615

- 1/ Escapement estimates were based on data collected on comprehensive aerial surveys of the spawning grounds; these escapement estimates supersede previously reported escapements, and are rounded to the nearest thousand fish.
- 2/ Comprehensive aerial coverage was begun in 1968; 1967 estimate was based on tower enumeration data, minimal aerial survey coverage, and general run strength indicators (commercial and subsistence catches).
- 3/ Aerial escapement precluded by adverse weather; however, the escapement was estimated from average mean exploitation rates from 1966-70 and 1972-76.
- 4/ Preliminary.

(Sources: 1, 5 and 13)

Appendix Table 40. Inshore commercial catch and escapement of chum salmon in the Nushagak and Togiak Districts, in numbers of fish, Bristol Bay, 1967-86. 1/

Year	Nushagak District			Togiak District		
	Catch	Escapement 2/	Total Run	Catch	Escapement 3/	Total Run
1967	338,286	200,000	538,286	63,322	179,000	242,322
68	178,786	100,000	278,786	108,001	348,000	456,001
69	214,235	130,000	344,235	66,389	85,000	151,389
70	435,033	273,000	708,033	100,711	241,000	341,711
71	360,015	226,000	586,015	123,847	229,000	352,847
1972	310,126	195,000	505,126	178,885	170,000	348,885
73	336,331	200,000	536,331	195,431	163,000	358,431
74	157,941	100,000	257,941	80,710	161,000	241,710
75	152,891	80,000	232,891	87,058	114,000	201,058
76	801,064	500,000	1,301,064	153,559	392,000	545,559
1977	899,701	609,000	1,508,701	270,649	496,000	766,649
78	651,743	293,000	944,743	274,967	396,000	670,967
79	440,279	166,000	606,279	219,942	293,000	512,942
80	681,930	969,000	1,650,930	299,682	415,000	714,682
81	795,143	177,000	972,143	229,886	331,000	560,886
1982	434,817	256,000	690,817	151,000	86,000	237,000
83	725,060	164,000	889,060	322,691	165,000	487,691
84	679,845 4/	362,000	1,041,845	339,064 4/	204,000	543,064
85	252,748 4/	288,000	540,748	206,370 4/	212,000	418,370
86	461,966 4/	200,300	662,266	269,722 4/	330,000	599,722
20 Year Average	465,397	274,415	739,812	187,094	250,500	437,594
1967-76 Average	328,471	200,400	528,871	115,791	208,200	323,991
1977-86 Average	602,323	348,430	950,753	258,397	292,800	551,197

1/ Escapement estimates supersede those previously reported and are rounded to the nearest thousand fish.

2/ Escapements were estimated from the following:
 1967 - tower enumeration data, and proportion of escapement to catch in 1966 and 1968;
 1968 and 1973-74 - tower enumeration and aerial survey data;
 1970-72 - average catch/escapement ratio for 1968-69 and 1973-81;
 1975-78 - aerial survey data;
 1979-86 - adjusted sonar estimate from Portage Creek site.

3/ Comprehensive aerial survey coverage began in 1967; however, surveys were not conducted in 1986 due to budget constraints. Estimate based on catch/escapement proportion using most recent 10 year average data.

4/ Preliminary.

(Sources: 1, 5 and 13)

Appendix Table 41. Nushagak District king salmon escapement and return by brood year, Bristol Bay, 1966-86. 1/

Brood Year	Escapement	Return by Age Group						Total	Return Per Spawner 2/
		3	4	5	6	7	8		
1966	40	+	21	32	38	5	1	99	2.46
67	65		10	18	47	25	+	100	1.54
68	70		15	19	68	9		110	1.57
69	35	+	1	15	30	3		49	1.40
1970	50		1	57	75	5	1	138	2.77
71	40		2	57	93	19		171	4.29
72	25		33	54	129	15		231	9.24
73	35		3	82	105	13		203	5.80
74	70		24	44	51			120	1.71
1975	70	1	95	146	156	13		411	5.87
76	100	2	8	110	157	6		282	2.82
77	65		89	156	209	15	+	468	7.19
78	130		27	49	59	22	+	156	1.20
79	95	2	48	68	85	11		(214)	(2.25)
1980	141		10	49	55			(113)	(0.80)
81	150	1	34	48				(82)	(0.55)
82	147	1	3					(5)	(0.03)
83	162	+							
84	81								
1985	116								
86	33								
Average 3/	61	+	25	65	94	12	+	195	3.19
Percent		0.1	13.0	33.0	47.9	5.9	0.1	100.0	

1/ All escapements and returns are rounded to the nearest thousand fish, and total returns may not equal the sum of the brood year returns by year.

2/ Returns in parentheses are incomplete.

3/ Averages and percentages computed from 1966-78.

(Sources: 1 and 13)

Appendix Table 42. Inshore commercial catch and escapement of pink salmon in the Kushnarak District, by river system, in number of fish, Bristol Bay, 1958-86. 1/

Year	Catch	Escapement					Total	Total R ²
		Wood 2/	Igushik 3/	Nuyakuk 4/	Nush/Mul 5/	Snake 6/		
1958	1,113,794			4,000,000			4,000,000	5,113,794
60	289,781			146,359			146,359	436,140
62	880,424	25,000	12,000	493,914	6,100	6,000	543,014	1,423,438
64	1,497,817	1,560	450	883,500	25,000	50	910,560	2,408,377
66	2,337,066			1,442,424			1,442,424	3,779,490
1968	1,705,150			2,161,116			2,161,116	3,866,266
70	417,834			152,580			152,580	570,414
72	67,953			58,536			58,536	126,489
74	413,613	44,800	7,500	529,216	3,100	900	585,516	999,129
76	739,580	21,986	5,070	794,478	41,800	100	863,434	1,603,014
1978	4,348,336	205,000	16,210	8,390,184	771,600	3,483	9,386,477	13,734,813
80	2,202,545	31,150	3,500	2,626,746	123,000	800	2,785,196	4,987,741
82	1,339,272	36,100	8,430	1,592,096	19,130	900	1,656,656	2,995,928
84	3,154,339 7/	81,400	6,190	2,760,312	73,050	5,500	2,926,452	6,080,791
86	280,623 7/			72,189 9/			72,189	
15 Year Average 8/	1,299,258	28,130	6,594	1,631,478	118,087	1,970	1,730,657	3,029,915

1/ Includes even-years only.

2/ Aerial survey estimate 1962 and 1974-84; tower count 1964.

3/ Aerial survey estimate 1962-80; aerial survey estimate and tower count 1976 and 1982-84.

4/ Tower count 1960-84; aerial survey estimate 1958, and below counting tower 1962-64 and 1974-84.

5/ Aerial survey estimate.

6/ Aerial survey estimate 1962-64, 1974-76 and 1980-84, and weir count 1978.

7/ Preliminary.

8/ Only years and systems with escapement data were included in averages.

9/ Sonar estimate from Portage Creek; no tower count conducted; Nush./Mul. included in the estimate.

(Sources: 1, 5, 13 and 20)

Appendix Table 43. Nushagak District pink salmon escapement and return by brood year, in numbers of fish, Bristol Bay, 1958-86. 1/

Brood Year	Escapement	Return	Return Per Spawner
1958	4,000	436	0.11
1960	146	1,423	9.75
62	543	2,408	4.43
64	911	3,779	4.15
66	1,442	3,866	2.68
68	2,161	570	0.26
1970	153	126	0.82
72	59	999	16.93
74	586	1,603	2.74
76	863	13,735	15.92
78	9,386	4,988	0.53
1980	2,785	2,996	1.08
82	1,657	6,081 2/	3.67
84	2,926	353 2/	0.12
86	72		
15 Year Average	1,846	3,097 3/	1.57

1/ Includes even-years only. All escapements and returns are rounded to the nearest thousand fish.

2/ Preliminary.

3/ Average computed from 1958-84.

(Sources: 1, 5, 13 and 20)

Appendix Table 44. Inshore commercial catch and escapement of coho salmon in the Nushagak and Togiak Districts, in numbers of fish, Bristol Bay, 1980-86. 1/

Year	Nushagak District			Togiak District		
	Catch	Escapement 2/	Total Run	Catch	Escapement 3/	Total Run
1980	147,726	232,000	379,726	151,000	96,000 a/	247,000
81	220,290	180,000 a/	400,290	29,207	61,000 b/	90,207
82	349,669	234,000	583,669	133,765	81,000 a/	214,765
83	81,338	51,000	132,338	5,711	12,000 c/	17,711
84	271,570 4/	171,000	442,570	170,948 4/	104,000 d/	274,948
85	20,285 4/	89,500	109,785	39,176 4/	61,300 e/	100,476
86	72,896 4/	52,772	125,668	48,440 4/	30,200 a/	78,640
7 Year Total	1,163,774	1,010,272	2,174,046	578,247	445,500	1,023,747
7 Year Average	166,253	144,325	310,578	82,607	63,643	146,250

- 1/ Escapement estimates are based on data collected from sonar enumeration and on comprehensive aerial surveys of the spawning grounds; these escapement estimates supersede previously reported escapements and are rounded to the nearest thousand fish.
- 2/ Sonar enumeration was begun in 1980; however, since sonar enumeration does not cover the complete season, a proportional method is used to estimate escapement after the sonar operation has terminated;
 - a/ sonar enumeration precluded by lack of funding; however, the escapement was estimated from average mean exploitation rates from 1980 and 1982-84.
- 3/ Comprehensive aerial survey coverage was begun in 1980; however, aerial coverage has been limited to:
 - a/ Togiak and Kulukak River drainages;
 - b/ Togiak, Kulukak, Ungalikthluk/Kukayachagak and Nunavachak drainages;
 - c/ aerial escapement precluded by adverse weather and water conditions; estimate based on exploitation rate.
 - d/ Togiak, Kulukak, Slug, Osviak and Matogak River drainages.
 - e/ Togiak, Kulukak, Quigmy, Matogak, and Osviak drainages
- 4/ Preliminary.

(Sources: 1, 5 and 13)

Appendix Table 45. Average round weight of the commercial salmon catch in pounds, by district and species, Bristol Bay, 1967-86. 1/

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Average Bristol Bay 2/
<u>SOCKEYE SALMON</u>						
1967						6.3
68				6.4		5.6
69	5.1	5.5		5.5	5.5	5.3
70	4.8	4.8		5.7	5.8	4.9
71	5.6	5.9		6.2	7.0	6.0
1972	6.1	6.0	6.1	6.0	6.4	6.0
73	6.7	7.1	7.3	7.1	7.9	7.1
74	5.5	5.7	5.2	5.7	7.0	5.8
75	5.2	5.7	5.2	6.1	6.7	5.5
76	5.8	5.9	6.2	6.6	7.5	6.1
1977	6.63	6.33	6.76	7.49	7.88	6.69
78	5.50	6.31	6.20	6.29	7.32	5.93
79	5.76	5.98	5.97	6.12	7.15	5.87
80	5.44	5.57	5.51	6.11	6.82	5.62
81	6.07	6.01	6.25	6.40	6.75	6.19
1982	6.26	6.40	6.51	6.40	7.36	6.40
83	5.52	5.82	5.73	5.87	6.65	5.66
84	5.41	5.79	5.61	6.16	6.80	5.60
85	5.62	5.78	5.82	5.88	6.50	5.75
86	6.14	5.93	6.14	5.88	6.67	6.04
<u>KING SALMON</u>						
1967						21.0
68				21.6		17.7
69	18.0			19.2	23.0	19.7
70	21.5	19.6		18.3	17.0	18.4
71	27.0	21.7		21.7	22.3	22.1
1972	25.5	21.6	17.3	19.8	21.1	20.3
73	23.5	21.4	21.0	22.6	24.1	23.0
74	20.8	18.6	20.7	23.2	21.0	22.4
75	25.0	19.5	18.1	18.8	14.0	17.8
76	27.6	18.6	13.5	18.7	12.1	17.0
1977	30.50	22.12	23.80	23.36	20.76	22.87
78	28.32	23.64	29.20	22.34	26.10	23.91
79	21.75	21.16	22.72	21.06	22.20	21.32
80	20.47	20.96	21.89	19.61	18.02	19.69
81	20.76	18.61	18.93	19.63	13.14	18.98

(continued)

Appendix Table 45. (continued)

Year	Naknek- Kvichak	Egegik	Ugashik	Nushagak	Togiak	Average Bristol Bay 2/
<u>KING SALMON (continued)</u>						
1982	19.39	18.46	20.07	20.40	15.40	19.55
83	20.81	20.19	21.51	20.96	20.69	20.91
84	19.95	18.69	19.52	20.78	20.32	20.45
85	19.04	17.27	19.07	16.90	19.26	17.86
86	15.63	16.83	18.60	19.87	16.34	18.84
<u>CHUM SALMON</u>						
1967						6.8
68						6.3
69		6.1	5.4	6.0	5.7	5.9
70	5.8	6.5		5.9	6.3	5.9
71	6.5			6.4	6.7	6.5
1972	6.5	6.4	5.7	6.5	6.6	6.5
73	7.3	6.9	7.7	7.0	7.3	7.1
74	6.4	6.4	7.2	6.2	7.4	6.6
75	6.3	6.2	6.1	6.1	6.6	6.3
76	5.9	5.8		6.9	7.1	6.8
1977	7.32	6.46	6.70	7.33	8.21	7.43
78	6.58	6.70	6.20	7.08	8.05	7.21
79	6.81	7.20	7.52	6.24	7.79	6.78
80	6.23	6.60	6.27	5.94	6.68	6.19
81	6.52	6.77	7.16	6.58	7.41	6.72
1982	6.31	6.61	6.83	6.67	7.30	6.71
83	6.05	6.70	6.33	6.43	7.56	6.61
84	6.41	6.85	6.49	6.54	7.80	6.77
85	6.62	6.60	6.81	6.30	7.51	6.76
86	6.51	6.21	6.62	6.49	7.39	6.70
<u>PINK SALMON</u>						
1968						3.0
70	2.9			3.0	3.7	3.0
72	3.4			3.1	3.8	3.1
74	4.3	3.9	4.1	3.6	4.4	4.0
76	3.7	3.8		3.3	4.1	3.4

(continued)

Appendix Table 45. (continued)

Year	Naknek- Kvichak	Egegik	Ugashik	Nushagak	Togiak	Average Bristol Bay 2/
<u>PINK SALMON (continued)</u>						
1978	3.59	3.20	3.30	3.11	3.77	3.19
80	3.57	3.41		3.36	3.80	3.39
82	3.56		4.08	3.45	3.52	3.46
84	3.64	3.75	3.06	3.18	3.78	3.21
86	4.00	3.78	3.41	3.27	3.91	3.47
<u>COHO SALMON</u>						
1967						7.0
68		8.6	9.1	7.3	8.8	8.5 3/
69		6.3	7.6	6.2	8.7	7.0
70				5.7	8.2	6.8
71				6.3		6.3
1972		6.1		6.3	7.6	7.0
73	5.6	6.3	6.8	6.0	7.5	6.7
74	6.7	6.5	7.2	6.7	8.6	7.9
75	6.7	7.2	7.2	6.1	9.2	8.6
76	5.5	6.9		6.0	8.3	7.6
1977				6.46	9.35	7.80
78	6.38	6.25		6.79	8.19	7.45
79	5.16	7.27	8.41	6.71	9.04	7.78
80	6.84	6.79	7.80	6.08	7.95	7.01
81	6.17	6.32	7.59	6.02	7.75	6.35
1982	7.18	7.07	7.72	6.81	8.65	7.31
83		6.68	7.15	6.52	7.14	6.62
84	6.03	6.94	7.69	6.60	8.94	7.45
85	7.04	7.65	7.89	7.28	9.13	8.03
86	5.47	6.71	7.06	5.91	7.79	6.71

1/ Average weight in pounds is weighted by the number of fish in the catch of each processor.

2/ Average weight in 1967-68 from annual "Alaska Catch and Production Commercial Fisheries Statistics" (Statistical Leaflet Series), and 1969-86 weighted by district from processor catch reports.

3/ Weighted by district from processor annual reports.

(Sources: 4 and 10)

Appendix Table 46. Salmon prices paid to fishermen by species, Bristol Bay, 1967-86. 1/

Species	Price Per Fish in Dollars 2/				Price Per Pound in Dollars 2/																1/
	1967	1968		1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
	INDEPENDENT FISHERMEN				AIFMA																4/
SOCKEYE	1.18	1.19	Canned	.24	.24	.26	.27	.35	.48	.37	.52	.595	.68	.80	.57	.75	.70	.58	.58		1.42
			Fresh/Frozen											1.25							
KING																					
Large	3.87	3.87																			
Medium	1.94	1.94	Canned	.18	.18	.20	.20	.28	.33	.35	.41	.45	.50	.55	.57	.75	.75	.50	.50		1.03
Small	1.03	1.03	Fresh/Frozen			.24	.24		.45	.40	.45	.65		.55		1.25	1.30				
CHUM	.60	.60	Canned	.11	.11	.12	.12	.18	.30	.18	.32	.375	.40	.55	.34	.42	.32	.25	.25		.31
			Fresh/Frozen											.55							
PINK	.33	.33		.11	.11	.12	.12	.18	.28	.19	.31	.36	.33	.33	.25	-	.18	-	-		.15
COHO	1.18	1.19	Canned	.20	.20	.26	.27	.35						.70				.75	.70	-	.68
			Fresh/Frozen	.20	.20	.30	.41	-	.405	-	.68	1.00	.57								
	COMPANY FISHERMEN				WACMA																
SOCKEYE	.73	.74	Canned	.14	.14				.30	.45	.475	.595	.68	.80	.57	.65	.56			.665	-
			Fresh/Frozen			.16	.17	.22						1.25		.75	.70	.65	.665	.850	-
KING																					
Large	2.78	2.78																		As	-
Medium	1.39	1.39	Canned	.11	.11				.35	.41	.45	.50	.52	.45		.75	-	-	-	Posted	-
Small	.69	.69	Fresh/Frozen			.12	.13	.18	.21	.40	.46	.65	.70	1.00		1.15	1.17	-	-		-
CHUM	.37	.37	Canned	.06	.06		.08	.08	.11	.19	.30	.32	.36	.38	.41	.34	.38	.32	.32	.32	.28
			Fresh/Frozen											.55							-
PINK	.17	.17		.06	.06	.08	.13	.11	.18	.28	.308	.308	.33	-	.25	-	.30 5/	-	-	-	-
COHO	.73	.74	Canned	.14	.14				.45	.475				.70	.65					.665	-
			Fresh/Frozen			.16	.13	.19	.26	.38	.405	.5325	.62	1.05	.57	.75	-	.65	.665	.850	-

1/ Company/independent fishermen classification was in effect through 1974; beginning in 1975 all fishermen are hereafter considered to be independent and the majority negotiated prices with the processors through the two active fishermen's groups in Bristol Bay (AIFMA - Alaska Independent Fishermen's Marketing Assn.; and WACMA - Western Alaska Cooperative Marketing Assn.).

2/ Prices per fish and per pound represent a fixed base level price structure, and does not include any subsequent additional payments.

3/ Due to the large number of processors with individual contracts and the increased percentage of the total harvest purchased by each buyer, the average price paid to all fishermen is listed.

4/ Information not available.

5/ Only a limited number of operators paid this price.

(Source: 9)

Appendix Table 47. Exvessel value of the commercial salmon catch in thousands of dollars, by species, Bristol Bay, 1967-86. 1/

Year	Sockeye	King	Chum	Pink	Coho	Total
1967	5,110	336	286	+	63	5,795
68	3,296	357	218	639	110	4,620
69	8,423	443	216	+	103	9,185
70	24,368	465	466	151	18	25,468
71	14,951	652	528	+	16	16,147
1972	3,914	339	512	47	20	4,832
73	1,892	284	829	+	115	3,120
74	3,793	460	567	1,053	142	6,015
75	11,047	214	615	+	151	12,027
76	17,139	742	2,892	1,093	82	21,948
1977	19,434	1,940	4,275	50	445	26,145
78	40,034	3,206	3,173	5,424	435	52,273
79	128,992	4,541	2,480	5	2,387	138,405
80	76,118	1,881	2,738	2,173	1,392	84,302
81	120,907	5,557	4,106	7	1,461	132,037
1982	68,122	6,088	2,145	1,111	3,199	80,665
83	129,900	2,853	3,216	+	337	136,306
84 2/	94,713	2,152	3,700	2,430	3,092	106,086
85 2/	114,256	2,204	1,812	+	916	119,188
86 2/	136,707	1,789	2,326	203	854	141,879
20 Year Average	51,155	1,825	1,855	1,432 3/	766	56,322
1967-76 Average	9,393	429	712	596	82	10,915
1977-86 Average	92,918	3,221	2,997	2,268	1,451	101,728

1/ Value paid to the fishermen. Derived from price per fish or pounds times commercial catch.

2/ Preliminary.

3/ Includes even-years only.

(Sources: 1, 5, 9 and 10)

Appendix Table 48. Salmon case pack by species, Bristol Bay, 1967-86. 1/

Year	48 1-lb. Cans Per Case				Coho	Total
	Sockeye	King	Chum	Pink		
1967	334,177	19,499	45,321	8	3,100	402,105
68	229,514	12,971	36,638	63,011	4,321	346,455
69	457,911	17,860	30,997	33	2,198	508,999
70	1,117,163	19,401	58,766	16,772	802	1,212,904
71	694,199	23,118	56,852		437	774,606
1972	197,495	9,666	53,756	5,002	547	266,466
73	61,429	1,946	42,044		1,456	106,875
74	87,723	6,461	23,789	39,550	7,012	164,535
75	290,646	1,920	22,667		373	315,606
76	393,698	6,889	104,935	36,616	1,068	543,206
1977	353,133	3,119	137,838	5	2,383	496,478
78	551,648	6,982	76,926	163,230	2,916	801,702
79	688,882	3,058	34,517		1,236	727,693
80	571,347	820	63,616	48,055	3,767	687,605
81	783,222	5,304	66,430	30	943	855,929
1982	193,321	1,700	17,320	26,789	7,510	246,640
83	800,390	6,178	47,227	7	705	854,507
84	649,315	1,740	69,026	108,206	9,765	838,052
85	297,884	2,257	18,367	15	430	318,953
86	205,015	1,037	11,168	2,024	502	219,746
20 Year Average	447,905	7,596	50,910	50,925 2/	2,573	534,453
1967-76 Average	386,395	11,973	47,576	32,190	2,131	464,175
1977-86 Average	509,415	3,219	54,243	69,660	3,015	604,730

1/ Includes only fish canned in Bristol Bay.

2/ Includes even-years only.

(Sources: 1, 4, and 17)

Appendix Table 49. Commercial production of frozen salmon by species, in pounds, Bristol Bay, 1967-86. 1/

Year	Sockeye	King	Chum	Pink	Coho	Total
1967	201,146	356,223	69,910		40,908	668,187
68	99,120	184,222	48,485			331,827
69	421,248	353,256	6,537		7,669	788,710
70	3,234,500	535,159	175,504	33,368	50	3,978,581
71	1,812,864	356,422	115,388	12	40,925	2,325,611
1972	54,571	362,653	60,466	790	24,308	502,788
73	186,663	557,422	307,790	11	98,115	1,150,001
74	147,475	281,821	7,212	113,241	582	550,331
75	101,751	230,045	133,339		444,344	909,479
76	883,620	570,837	163,030	215,176	117,603	1,950,266
1977	586,098	1,155,791	336,283	258	235,607	2,314,037
78	6,306,661	1,848,951	761,029	1,580,236	145,355	10,642,232
79	38,031,872	2,291,378	1,231,334	2,451	1,350,300	42,907,335
80	31,855,642	1,189,870	1,391,797	3,040,765	828,114	38,306,188
81	49,613,633	2,602,066	1,371,467	2,652	1,065,573	54,655,391
1982	57,636,789	3,045,713	2,183,075	2,346,198	2,746,413	67,958,188
83	103,432,084	2,723,637	2,372,852	5,929	415,890	108,950,392
84	67,355,538	1,256,414	1,898,387	1,939,511	2,219,281	74,669,131
85	91,318,967	1,238,975	2,569,767	209	467,440	95,595,358
86	75,010,887	1,421,379	6,130,639	1,175,236	1,072,983	84,811,124
20 Year Average	26,414,556	1,128,112	1,066,715	1,044,452 2/	566,073	29,698,258
1967-76 Average	714,296	378,806	108,766	72,515	77,450	1,315,578
1977-86 Average	52,114,817	1,877,417	2,024,663	2,016,389	1,054,696	58,080,938

1/ Includes only fish processed in Bristol Bay.

2/ Includes even-years only.

(Source: 3)

Appendix Table 50. Commercial production of cured salmon by species, in pounds, Bristol, Bay, 1967-86. 1/

Year	Sockeye	King	Chum	Pink	Coho	Total
1967	11,850	4,410	1,802		6,300	24,362
68	210,006	142,645	77,963	1,504	270,286	702,404
69	330,443	394,217	371,321	133	409,114	1,505,228
70	37,298	153,503	86,795	509	14,026	292,131
71	14,922	148,354	12,778		5,682	181,736
1972	10,526	3,959	8,614	32	28,547	51,678
73	23,851	4,617	27,768		17,539	73,775
74	24,977	5,402	2,505	65	4,530	37,479
75	11,863	20,660	81			32,604
76	4,210	62	90			4,362
1977	3	20	90		3,171	3,284
78	680,402	4,664	17,388	97,390	3,410	803,254
79	3,651,146	16,824	136,585	403	1,000	3,805,958
80	4,242,063	9,603	286,113	9,649	6,653	4,554,081
81	4,956,561	23,663	148,051		6,526	5,134,801
1982	3,222,798	75,752	277,013	12,780	1,466	3,589,809
83	5,045,048	22,259	266,005		595	5,333,907
84	1,608,948	12,200	131,915	8,545	79,540	1,841,148
85	2,059,078	5,344	50,612			2,115,034
86	1,447,014	1,231	42,453		2,185	1,492,803
20 Year Average	1,379,650	52,469	97,297	13,047 2/	43,029	1,578,996
1967-76 Average	67,995	87,783	58,972	422	75,602	290,576
1977-86 Average	2,691,306	17,156	135,623	25,673	10,455	2,867,416

1/ Includes only fish processed in Bristol Bay.

2/ Includes even-years only.

(Source: 3)

Appendix Table 51. Fresh export of salmon by air transportation, by species, in pounds, Bristol Bay, 1967-86. 1/

Year	Sockeye	King	Chum	Pink	Coho	Total
1967	183	73,773	184		124,502	198,642
68	9,884	74,693	806		1,717	87,100
69		75,293	2,372		217	77,882
70	676	185,564	661			186,901
71		232,912				232,912
1972	20,754	359,533	6,442		4,837	391,566
73	163,447	326,372	238,851	183	134,260	863,113
74	253,879	253,695	35,102	104,230	15,116	662,022
75	374,588	128,032	71,744	45	10,313	584,722
76	498,014	445,386	213,118	96,038	22,559	1,275,115
1977	997,899	1,134,791	961,537	14,438	409,058	3,517,723
78	5,149,427	1,548,439	984,408	1,967,420	341,212	9,990,906
79	22,838,654	1,652,904	1,176,549	3,822	933,539	26,605,468
80	23,284,065	514,638	617,989	612,276	1,196,502	26,225,470
81	25,943,037	1,302,979	817,991	9,385	800,432	28,873,824
1982	20,416,684	2,056,650	1,027,817	166,672	1,576,761	25,244,584
83	26,641,032	978,050	552,536	35	248,582	28,420,235
84	7,487,073	565,038	713,898	92,837	1,351,689	10,210,535
85	12,282,823	789,267	1,094,089	733	518,574	14,683,486
86	3,604,592	286,482	281,327	6,357	104,724	4,283,482
20 Year Average	7,498,336	649,125	439,871	304,583 2/	389,730	9,130,784
1967-76 Average	132,143	215,525	56,928	40,054	31,352	455,998
1977-86 Average	14,864,529	1,082,724	822,814	569,112	748,107	17,805,571

1/ Includes all fish exported out of Bristol Bay by air in fresh condition regardless of final processing.

2/ Includes even-years only.

(Source: 3)

Appendix Table 52. Brine export of salmon by sea-going transportation, Bristol Bay, 1967-86. 1/

Year	Number 2/		Brine Export	
	Operators	Tenders	Number	Pounds
1967			127,818	807,144
68			97,404	466,488
69			297,973	1,592,593
70	7	(60)	2,712,837	13,327,829
71	5	(12)	523,784	3,162,326
1972	1	(1)	59,750	365,386
73	0	0	0	0
74	2	(2)	78,620	456,430
75	5	(20)	933,728	5,135,799
76	5	(21)	728,420	4,466,126
1977	5	15	623,523	3,603,382
78	9	(33)	1,602,224	9,304,376
79	12	(61)	2,987,456	17,557,354
80	14	101	4,987,000	27,780,210
81	18	80	3,300,118	20,512,734
1982	8	27	565,891	3,582,904
83	13	85	4,428,741	25,199,944
84	9	55	2,672,519	14,919,944
85	9	26	973,826	5,521,739
86	4	17	715,646	4,349,044
20 Year Average	7 3/	36 3/	1,420,864	8,105,588
1967-76 Average	3	12	556,033	2,978,012
1977-86 Average	10	50	2,285,694	13,233,163

1/ Includes only fish exported from Bristol Bay in brine or chilled sea water by sea-going tenders for eventual processing.

2/ Number of operators and tenders unavailable prior to 1970. Figures in parentheses are estimates.

3/ Seventeen year average.

(Source: 3)

Appendix Table 53. Commercial production and disposition of sockeye salmon, in thousands of pounds, Bristol Bay, 1967-86. 1/

Year	Export 2/										Total
	Canned		Frozen		Cured		Fresh		Brine 3/		
	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds	%	
1967	26,264	96	201	1	12	+	+	+	807	3	27,284
68	14,865	95	98	1	201	1	10	+	466	3	15,649
69	32,750	93	421	1	331	1			1,593	5	35,095
70	84,932	84	3,236	3	37	+	1	+	13,328	13	101,534
71	52,514	91	1,813	3	15	+			3,162	5	57,504
1972	14,045	97	55	+	11	+	21	+	365	3	14,497
73	5,030	93	187	3	24	+	163	3			5,404
74	7,020	89	147	2	25	+	254	3	456	6	7,902
75	21,319	79	102	+	12	+	375	1	5,136	19	26,944
76	28,426	83	884	3	4	+	498	1	4,466	13	34,278
1977	27,495	84	586	2	+	+	988	3	3,603	11	32,672
78	37,136	63	6,307	11	680	1	5,149	9	9,304	16	58,576
79	44,350	35	38,032	30	3,651	3	22,839	18	17,557	14	126,429
80	46,379	35	31,856	24	4,242	3	23,284	17	27,780	21	133,541
81	57,456	36	49,614	31	4,957	3	25,943	17	20,513	13	158,483
1982	11,808	12	57,637	60	3,223	3	20,417	21	3,583	4	96,668
83	54,571	25	103,432	48	5,045	2	26,641	12	25,200	12	214,889
84 4/	46,787	34	67,356	49	1,609	1	7,487	5	14,920	11	138,159
85 4/	23,730	18	91,319	68	2,059	1	12,283	9	5,522	4	134,913
86 4/	11,536	12	75,011	78	1,447	1	3,605	4	4,349	5	95,948
20 Year Average	40,354	48	26,446	31	1,381	2	7,498	9	8,438	10	84,116
1967-76 Average	44,582	91	778	2	70	+	132	+	3,643	7	49,205
1977-86 Average	36,125	30	52,115	44	2,691	2	14,864	13	13,233	11	119,028

1/ Frozen and cured production includes some mixed fish (mostly chums).

2/ Includes all sockeye exported out of Bristol Bay regardless of final processing.

3/ Primarily sockeye salmon with minimal numbers of king and chum salmon.

4/ Preliminary.

(Sources: 1, 3 and 4)

Appendix Table 54. South Unimak and Shumagin Island sockeye and chum salmon preseason quota and actual commercial catch, in thousands of fish, Alaska Peninsula, 1967-86. 1/

Year	South Unimak			Shumagin Islands			Total		
	Sockeye			Sockeye			Sockeye		
	Actual	Quota 2/	Chum	Actual	Quota 2/	Chum	Actual	Quota	Chum
1967	186		73	69		51	255		124
68	342		115	233		51	575		166
69	781		254	76		13	857		267
70	1,530		403	153		49	1,683		452
71	565		554	45		115	610		669
1972	443		468	76		108	519		576
73	239		189	23		23	262		212
74	60	50	15		25		60	75	15
75	190	165	65	49	50	36	239	304	101
76	235	350	327	72	75	74	307	634	401
1977	193	195	93	46	42	22	239	332	115
78	419	428	105	68	94	18	487	592	123
79	683	900	64	179	200	41	862	926	105
80	2,731	2,513	457	572	555	71	3,303	3,760	528
81	1,474	1,442	521	351	318	54	1,825	2,346	575
1982	1,670	1,850	934	451	408	160	2,121	3,055	1,094
83	1,545	1,469	615	416	324	169	1,961	2,576	784
84	1,131	1,111	228	257	245	109	1,388	1,616	337
85	1,495	1,380	345	367	305	134	1,862	2,207	479
86	314	907	252	156	200	99	470	722	351
20 Year Average	811		304	193		74	994		374
1967-76 Average	457		246	88		58	537		298
1977-86 Average	1,166	1,220	361	286	269	88	1,452	1,813	449

1/ South Unimak includes statistical area 284 in June and July, while Shumagin Islands includes statistical area 282 in June only.

2/ The sockeye quota management system was initiated in 1974, and is based on the final Bristol Bay projected inshore harvest and traditional harvest patterns.

(Source: 12)

Appendix Table 55. Subsistence catch of salmon by district and species, Bristol Bay, 1967-86.

		Number of Fish 1/					
Year	Permits Issued	Sockeye	King	Chum	Pink	Coho	Total
<u>NAKNEK-KVICHAK DISTRICT</u>							
1967		68,500	500	100	+	500	69,600
68		71,000	500	100	300	200	72,100
69		76,300	400	100	+	400	77,200
70	145	108,200	300	700	100	200	109,500
71	137	66,400	200	+	+	100	66,700
1972	170	52,200	400	400	700	100	53,800
73	219	41,600	600	300	+	500	43,000
74	263	102,600	1,000	1,100	1,600	200	106,500
75	301	122,600	700	300	+	200	123,800
76	346	82,200	900	900	1,500	600	86,100
1977	352	81,400	1,300	600	100	300	83,700
78	392	93,000	1,200	1,000	1,400	300	96,900
79	424	75,000	1,200	600		1,200	78,000
80	759	88,200	1,500	1,200	2,100	800	93,800
81	649	85,100	1,000	400	100	1,100	87,700
1982	350	71,400	1,100	600	900	1,000	75,000
83	385	107,900	1,000	400	300	900	110,500
84	382	115,200	900	600	1,300	600	118,600
85	544	107,543	1,179	540	27	1,103	110,392
86	412	77,283	1,295	695	2,007	650	81,930
20 Year Average	366	84,681	859	560	1,191	548	86,571
<u>EGEGIK DISTRICT</u>							
1972	2					100	100
73	3					100	100
74	7	300	+	+		+	300
75	3	200	+	+	+	+	200
76 3/	2						
1977	20	100	+	100	+	200	400
78	13	200		100		200	500
79	8	300				100	400
80	3	100					100
81	4	+	+			+	+
1982	19	2,400	+			+	2,400
83	14	700	+			+	700
84	24	500	+	100	+	300	900
85	23	582	14	21	1	203	821
86	41	1,052	69	58	21	319	1,519
15 Year Average	9	500	+	+	+ 2/	100	500

(continued)

Appendix Table 55. (continued)

Year	Permits Issued	Number of Fish 1/					Total
		Sockeye	King	Chum	Pink	Coho	
UGASHIK DISTRICT							
1967	5	700	+	100	+	500	1,300
68	8	300	+	100	+	300	700
69	3	100				200	300
70	9	1,400	+	+		+	1,400
71	9	300		+		100	400
1972	13	200	100	100	+	300	700
73	14	200	+	100	+	600	900
74	8	200	100	+	+	500	800
75	1	700	+	+	+	1,200	1,900
76	21	1,200	100	100	100	300	1,800
1977	19	1,000	100	300	+	500	1,900
78	8	500	100	100	+	900	1,600
79	8	200	+	+	+	100	300
80	10	200	+	+	+	200	400
81	12	600	+	+		200	800
1982	11	400	+	+	+	300	700
83	8	500	+	+		100	600
84	8	500	+	+		200	800
85	9	233	17	7		143	400
86	27	1,080	83	48	21	335	1,567
20 Year Average	11	526	30	48	6	349	963

(continued)

Appendix Table 55. (continued)

Year	Permits Issued	Number of Fish 1/					
		Sockeye	King	Chum	Pink	Coho	Total
NUSHAGAK DISTRICT							
1967	128	34,900	3,700	14,000	800	4,000	57,400
68	115	30,000	6,600	8,600	5,800	1,900	52,900
69	162	27,700	7,100	8,200	100	7,100	50,200
70	147	41,100	6,300	9,400	1,500	900	59,200
71	164	42,400	4,400	4,200	+	2,300	53,300
1972	168	24,100	4,000	8,200	1,200	1,000	38,500
73	216	28,000	6,600	7,600	100	2,200	44,500
74	261	41,200	7,900	10,200	4,300	4,700	68,300
75	340	47,300	7,100	5,600	1,300	4,300	65,600
76	317	34,700	6,900	7,200	2,700	2,100	53,600
1977	306	43,300	5,200	7,300	200	4,500	60,500
78	331	33,200	6,600	14,300	11,100	2,500	67,700
79	364	40,200	8,900	6,800	500	5,200	61,600
80	425	76,800	11,800	11,700	7,600	5,100	113,000
81	395	44,600	11,500	10,200	2,300	8,700	77,300
1982	376	34,700	12,100	11,400	7,300	8,900	74,400
83	389	38,400	11,800	9,200	500	5,200	65,100
84	438	43,200	9,800	10,300	6,600	8,100	78,000
85	406	38,000	7,900	4,000	600	6,100	56,600
86	424	49,000	12,600	10,000	5,400	9,400	86,700
20 Year Average	294	39,640	7,940	8,920	5,350 2/	4,710	64,220
TOGIAC DISTRICT							
1974	68	7,400	1,200	2,000	500	1,800	12,900
75	41	4,600	800	1,600	+	2,800	9,800
76	30	2,800	500	900	100	500	4,800
77	41	2,100	400	800	+	1,100	4,400
78	29	900	300	700	300	500	2,700
1979	25	800	200	300	+	700	2,000
80	46	3,600	900	300	300	1,200	6,300
81	52	1,900	400	800	100	2,200	5,400
82	50	1,900	400	300	400	1,300	4,300
83	38	1,900	700	900	200	800	4,500
1984	41	3,600	600	1,700	500	3,800	10,200
85	51	3,400	600	1,000	100	1,500	6,600
86	29	2,400	700	800	100	500	4,500
13 Year Average	42	2,869	592	931	314 2/	1,438	6,031

(continued)

Appendix Table 55. (continued)

Year	Permits Issued	Number of Fish				1/	
		Sockeye	King	Chum	Pink	Coho	Total
TOTAL BRISTOL BAY							
1967		104,100	4,200	14,200	800	5,000	128,300
68		101,300	7,100	8,800	6,100	2,400	125,700
69		104,100	7,500	8,300	100	7,700	127,700
70	301	150,700	6,600	10,100	1,600	1,100	170,100
71	310	109,100	4,600	4,200	+	2,500	120,400
1972	353	76,500	4,500	8,700	1,900	1,400	93,000
73	452	69,800	7,200	8,000	100	3,300	88,400
74	607	151,700	10,200	13,300	6,400	7,200	188,800
75	686	175,400	8,600	7,500	1,300	8,500	201,300
76	716	120,900	8,400	9,100	4,400	3,500	146,300
1977	738	127,900	7,000	9,100	300	6,600	150,900
78	773	127,600	8,100	16,200	12,700	4,400	169,000
79	829	116,500	10,300	7,700	500	7,300	142,300
80	1,243	168,600	14,100	13,100	10,000	7,300	213,100
81	1,112	132,100	13,000	11,500	2,600	12,200	171,400
1982	806	110,800	13,700	12,400	8,600	11,500	157,000
83	834	149,400	13,500	10,500	900	7,100	181,400
84	893	163,000	11,300	12,700	8,400	13,000	208,400
85	1,033	149,758	9,710	5,568	728	9,049	174,813
86	930	131,111	14,826	11,630	7,485	11,144	176,196
20 Year Average	742	127,004	9,218	10,128	6,765 2/	6,613	156,711
1967-76 Average	489	116,360	6,890	9,220	4,080 2/	4,260	139,000
1977-86 Average	919	137,647	11,546	11,037	9,450 2/	8,965	174,423

1/ Catches prior to 1985 rounded to the nearest hundred fish.

2/ Includes even years only.

(Sources: 1 and 8)

Appendix Table 56. Subsistence catch of sockeye salmon by village area, in numbers of fish, Kvichak River drainage, Bristol Bay, 1967-86. 1/

Year	Levelock	Igiugig	Pedro Bay	Kokhanok	Iliamna- Newhalen	Nondalton	Port Alsworth	Total
1967	1,400	3,400	9,900	10,200	9,100	29,600		63,600
68	1,400	4,800	9,800 2/	10,200 2/	8,700	33,700		68,600
69	1,000 2/	5,100	4,200	15,000	4,900	44,000		74,200
70	1,600 2/	11,200	11,200	22,300	16,400	42,900		105,600
71	1,600 2/	6,500	10,100	12,800	8,500	22,100		61,600
1972	1,600 2/	2,200	4,000	8,300	10,000	24,100		50,200
73	4,800	2,200	2,900	9,200	10,200	8,500	1,300	39,100
74	8,600	6,200	14,400	21,500	16,400	29,500	1,500	98,100
75	5,300	6,400	8,300	18,000	26,700	48,700	2,100	115,500
76	5,300	6,800	4,400	17,100	16,300	20,500	5,500	75,900
1977	2,600	6,000	5,600	14,300	11,400	27,200	4,900	72,000
78	8,900	8,800	11,200	23,700	11,000	17,300	3,000	83,900
79	4,400	6,600	3,500	16,200	15,900	14,700	4,200	65,500
80	6,100	8,100	7,400	22,600	11,100	11,300	6,000	72,600
81	6,600	5,400	9,700	16,500	15,400	15,200	6,800	75,600
1982	5,400	1,900	8,200	16,600	13,500	11,200	4,500	61,300
83	4,800	3,300	10,400	20,100	23,800	29,400	4,700	96,500
84	8,100	6,300	12,100	24,400	15,900	29,100	4,600	100,500
85	6,600	3,400	12,900	21,900	22,300	14,900	4,500	86,500
86	6,400	1,600	6,700	18,300	17,000	6,600	3,300	59,900
20 Year Average	4,625	5,310	8,345	16,960	14,225	24,025		76,335
1967-76 Average	3,260	5,480	7,920	14,460	12,720	30,360		75,240
1977-86 Average	5,990	5,140	8,770	19,460	15,730	17,690	4,650	77,430

1/ Catches rounded to nearest hundred fish. The totals include the harvests of all subsistence permit holders fishing in each village area, including the harvests of non-residents of the local community, area, or district.

2/ Catch interpolated.

(Sources: 1 and 8)

Appendix Table 57. Subsistence salmon catch by village area, Nushagak District, Bristol Bay, 1967-86. 1/

Year	Dillingham 2/	Manokotak	Aleknagik	Ekwok	New Stuyahok	Koliganek	Total
1967	34,700	11,600	5,800	3,900	800	1,200	57,400
68	31,400	10,500	5,200	3,500	700	1,000	52,900
69	33,500	7,700	3,900	2,600	1,300	800	50,200
70	33,300	8,100	1,200	10,700	3,000	2,900	59,200
71	18,100	8,600	4,200	10,400	5,600	6,400	53,300
1972	12,600	3,900	800	6,700	7,000	7,500	38,500
73	19,700	4,700	1,100	8,600	6,800	3,600	44,500
74	23,900	11,600	2,300	10,500	11,800	8,200	68,300
75	22,100	7,100	2,300	6,800	19,200	8,100	65,600
76	17,700	8,400	2,000	9,000	11,100	5,400	53,600
1977	15,700	8,100	1,500	8,000	20,900	6,300	60,500
78	27,700	3,200	2,700	12,900	14,200	7,000	67,700
79	20,600	7,400	1,000	7,200	17,200	8,200	61,600
80	47,900	8,200	3,500	10,400	22,200	20,800	113,000
81	23,900	6,700	2,900	8,800	23,600	11,400	77,300
1982	24,700	2,900	2,400	7,500	22,600	14,300	74,400
83	20,100	5,300	1,900	5,800	18,700	13,300	65,100
84	30,500	4,100	2,600	7,200	16,500	17,100	78,000
85	22,900	3,600	1,600	7,000	14,500	6,800	56,400
86	31,900	5,500	6,900	7,800	26,400	8,200	86,700
20 Year Average 3/	25,645	6,860	2,790	7,765	13,205	7,925	64,190
1967-76 Average	24,700	8,220	2,880	7,270	6,730	3,970	54,310
1977-86 Average	26,590	5,500	2,700	8,260	19,680	11,340	74,070

1/ Catches rounded to nearest hundred fish. Totals include the harvests of all subsistence permit holders fishing in each village area, including non-residents of the local community, area, or district.

2/ Includes the village of Portage Creek.

3/ Over the past 20 years the average Nushagak subsistence catch was composed of 62% sockeye, 12% king, 14% chum, 8% pink and 7% coho salmon.

(Sources: 1 and 8)

The sockeye salmon return to the Kvichak River for 1986 is forecasted to be 4.5 million fish. The escapement goal for the Kvichak River is 5 million sockeye salmon, with a range of 4 to 6 million. The sockeye salmon return to Naknek River for 1986 is forecasted to be approximately 3.2 million fish. The escapement goal for the Naknek River is 1 million, with a range of 0.8 to 1.4 million.

In order to help ensure the minimum escapement goal for the Kvichak River will be met, management of the Naknek/Kvichak District will be very conservative during the 1986 season.

1. The Naknek/Kvichak District will be open to fishing by both gear types for regular periods from May 1 through the weekly fishing period that ends on June 14. Information on catches during these openings will assist in determining stock composition within the district.
2. Fishing during the period of June 16 through 21 may be restricted in the Kvichak Section in accordance with 5 AAC 06.320(f). This concern is based upon the pre-season forecast and the potential to overharvest the early segment of the Kvichak River return. Any change to the regular fishing period will be determined after assessment of the latest stock information.
3. THE Kvichak Section will be closed on June 21, 1986 and remain closed until 4 million sockeye salmon have escaped into the Kvichak River.
4. When it is determined that the minimum goal of 4 million will be met as outlined in (3), but the magnitude of the total return to the Kvichak River is unknown, the Kvichak Section may be opened to "setnet fishing only" in accordance with 5 AAC 06.320(f). The amount of fishing time allowed will depend on daily assessments of timing and strength of the Kvichak River run.
5. The Kvichak Section will be opened to both gear types when it is projected the mid-point of the escapement goal (5 million) will be exceeded. The amount of fishing time allowed will depend on daily assessments of timing and strength of the Kvichak River run.
6. The Naknek Section will be managed for both gear types based on Naknek River escapement and the interception rate of Kvichak River stocks.
 - a. If Kvichak River escapement is lagging, and Naknek Section catch contains a majority of Kvichak River fish, the Naknek Section boundaries may be reduced by emergency order.
 - b. With reduced Naknek Section boundaries and continued lagging Kvichak River escapement, if the Naknek Section catch continues to contain a significant percentage of Kvichak River stocks, the Naknek Section may be closed to either or both gear types.
 - c. When the Naknek River escapement is projected to exceed 1.2 million, and implementation of a. and b. above have failed to achieve the 5 million escapement goal in the Kvichak River, the Naknek River special harvest area, as described in 5 AAC 06.360 will be implemented by emergency order.
7. When it is determined that there are extreme shortages in Kvichak River escapement, boundary reductions and reduced fishing times may be implemented in both the Egegik and Ugashik Districts, if data indicate significant numbers of Kvichak River sockeye salmon are being intercepted.

APPENDIX B

Bristol Bay Sockeye Salmon Forecast Evaluation for 1986 (Informational Leaflet No. 255, April, 1986).

Total Bristol Bay Forecast

The Standard ADF&G and Japanese Research Catches methods produced total Bristol Bay forecasts of 23.7 and 19.1 million sockeye salmon, respectively (Table 1). The Japanese Research Catches method produced a slightly greater two-ocean age group prediction (13.7 million) and a much lesser three-ocean age group prediction (5.4 million) than the Standard ADF&G method (11.9 and 11.8 million two-ocean and three-ocean returns, respectively, Table 2).

Differences in total and ocean age group predictions between the Standard ADF&G and Japanese Research Catches methods were difficult to reconcile since the past performance of both methods, indicated by their standard errors, was similar (Table 3). The final weighted pooled forecast of total returns was 22.5 million sockeye salmon (Table 4), with an 80% confidence interval of 15.1 to 29.9 million. Total projected harvest was 13.3 million sockeye salmon (Table 4), with an 80% confidence interval of 7.5 to 20.2 million (assuming the proportion of the total run returning to individual systems remained constant for total run sizes within the 80% confidence interval).

Comparison of Japanese Research Vessel Data Models

Comparison of hindcast results of the three models using Japanese research vessel catch data indicated that the Japanese Research Catches model was most accurate for two-ocean returns and least accurate for three-ocean returns (Table 3). However, these performance differences were small and all three models produced similar total forecasts for 1986 (Table 2). Pooling Standard ADF&G results with those obtained from the Temperature-Length and Geometric Mean CPUE models produced by pooling Standard ADF&G with Japanese Research Catches estimates. These results were in accord with the assumption that combining temperature, length, and CPUE data into a single model (i.e., Japanese Research Catches model) would not affect forecasting performance.

River-Lake System Forecasts

Final forecasts for each system and major age class (Table 4) were based upon the distribution of returns within the Standard ADF&G forecast (Table 5). The Standard ADF&G forecast for each system and major age class was calculated as the un-weighted mean of results from three components: spawner-recruit (used for all systems and age classes), sibling age classes (used for all systems and age classes whenever possible), and smolt (used for Kvichak and Wood River systems only). Cases in which results of a component were excluded from final calculations, as well as problem areas where inconsistencies in results among components were encountered, are identified and discussed under the appropriate sections.

APPENDIX B (continued)

SUMMARY

The total forecast based upon the Standard ADF&G method was only 24% greater than that based upon the Japanese Research Catches method (Table 1). The greatest difference between the two methods was found for three-ocean return predictions: the Standard ADF&G estimate was about twice the estimate based on Japanese Research Catches (Table 15). Since the past performance of the Standard ADF&G method has been somewhat better than that of the Japanese Research Catches method (Tables 2 and 3), the pooled forecast most closely resembled the Standard ADF&G estimate (Table 15). Inconsistencies between the two methods, as well as among component models within the Standard ADF&G method, indicate that the most likely deviations from the pooled forecast for most systems would be greater than predicted two-ocean returns and less than predicted three-ocean returns (Table 16).

APPENDIX B (continued)

Synopsis of sockeye salmon returns to Bristol Bay, Alaska, river-lake systems for age classes in which deviations of forecasted from actual returns are most likely to occur in 1986.

System	Age Class	Forecast (millions)	Summary of Indicators	Possible Deviation
Kvichak	4(2)	1.226 (0.791-1.663)	No 3(2) return in 1985, but smolt prediction five times greater than spawner-recruit prediction and two-ocean returns in Japanese Research Catches prediction greater than that in Standard ADF&G.	GREATER RETURN (upper 80% CI)
	5(3)	2.257 (1.454-3.059)	No 4(3) return in 1985, but smolt prediction two times greater than spawner-recruit prediction and two-ocean returns in Japanese Research Catches prediction greater than that in Standard ADF&G.	GREATER RETURN (upper 80% CI)
Naknek	4(2)	0.588 (0.360-0.756)	Smolt prediction about two times greater than spawner-recruit and sibling age classes predictions; two-ocean returns in Japanese Research Catches prediction greater than that in Standard ADF&G.	GREATER RETURN (upper 80% CI)
	5(3)	0.960 (0.619-1.301)	Smolt prediction about three times greater than spawner-recruit and sibling age classes predictions; two-ocean returns in Japanese Research Catches prediction greater than that in Standard ADF&G.	GREATER RETURN (above upper 80% CI)

-Continued-

APPENDIX B (continued)

System	Age Class	Forecast (millions)	Summary of Indicators	Possible Deviation
Egegik	6(3)	1.857 (1.313-2.400)	Smolt prediction four times less than spawner-recruit and almost two times less than sibling age classes prediction; three-ocean component of Japanese Research Catches prediction much less than that in Standard ADF&G.	LESSER RETURN (below lower 80% CI)
Ugashik	4(2)	0.454 (0.293-0.616)	Smolt prediction almost eight times greater than spawner-recruit and sibling age classes predictions; two-ocean returns in Japanese Research Catches prediction greater than that in Standard ADF&G.	GREATER RETURN (above upper 80% CI)
	5(3)	2.378 (1.533-3.224)	Smolt prediction about two times greater than spawner-recruit and thirteen times greater than sibling age classes predictions; two-ocean returns in Japanese Research Catches prediction greater than that in Standard ADF&G.	GREATER RETURN (above upper 80% CI)
	5(2)	1.342 (0.949-1.734)	Smolt prediction about three times less than spawner-recruit and sibling age classes predictions; three-ocean returns in Japanese Research Catches prediction much less than that in Standard ADF&G.	LESSER RETURN (below lower 80% CI)

-Continued-

APPENDIX B (continued)

System	Age Class	Forecast (millions)	Summary of Indicators	Possible Deviation
Ugashik	6(3)	0.722 (0.510-0.933)	This would be greatest 6(3) return ever observed, previous record 0.533 million in 1985; all Standard ADF&G component predictions greater than 0.653 million, but three-ocean returns in Japanese Research Catches prediction much less than that in Standard ADF&G.	LESSER RETURN (lower 80% CI)
Wood	5(2)	0.774 (0.547-1.001)	Low 5(2) return when compared with range of 1.1 to 2.4 million for previous eight years; spawner-recruit and smolt predictions both about 1.0 million, sibling age classes prediction about 0.7 million; three-ocean returns in Japanese Research Catches prediction much less than that in Standard ADF&G.	GREATER RETURN (upper 80% CI)
Igushik	5(2)	0.456 (0.322-0.589)	Spawner-recruit prediction over two times greater than sibling age classes prediction; three-ocean returns in Japanese Research Catches prediction much less than that in Standard ADF&G.	LESSER RETURN (lower 80% CI)
Togiak	5(2)	0.299 (0.212-0.387)	Sibling age classes prediction almost three times less than spawner-recruit prediction; three-ocean returns in Japanese Research Catches prediction much less than that in Standard ADF&G.	LESSER RETURN (lower 80% CI)

APPENDIX C.

BRISTOL BAY TIDE
TABLES, MAY-SEPTEMBER

1986

1986 TIDE TABLES

BIGGER THE NOT-BETTER FISHING
PUBLISHED CONTINUALLY SINCE 1880

NUSHAGAK TIDES

NUSHAGAK BAY DISTRICT

CONNECTION TABLE

To convert the TIME and HEIGHT for
HIGH or LOW TIDES for the points given be-
low, add or subtract TIME and FEET from
the NUSHAGAK District Tide Table.

High Low High Low

Port Moller (Entrance Point) -4:25 -4:30 +56 +56

Port Moller -4:35 -4:35 +56 +56

Kivichuk River -4:35 -4:35 +56 +56

Kivichuk River -4:35 -4:35 +56 +56

Kivichuk River -4:35 -4:35 +56 +56

Kivichuk River -4:35 -4:35 +56 +56

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HIGH Tides NUSHAGAK District

MAY 1986

1	Thur	10:17	22.7	10:11	16.0
2	Fri	11:09	21.9	11:21	16.2
3	Sat			12:02	20.9
4	SUN	0:26	16.5	12:53	19.8
5	Mon	1:31	16.9	1:41	18.5
6	Tues	2:37	17.4	2:26	17.2
7	Wed	3:36	18.0	3:11	15.8
8	Thur	4:31	18.6	3:53	14.6
9	Fri	5:17	19.0	4:35	13.6
10	Sat	6:03	19.4	5:14	12.8
11	SUN	6:41	19.5	5:52	12.3
12	Mon	7:20	19.6	6:31	12.1
13	Tues	7:59	19.7	7:13	12.0
14	Wed	8:36	19.7	7:55	12.1
15	Thur	9:15	19.7	8:41	12.4
16	Fri	9:51	19.6	9:32	12.8
17	Sat	10:28	19.4	10:26	13.5
18	SUN	11:06	19.1	11:26	14.5
19	Mon	11:42	18.7		
20	Tues	0:25	15.8	12:24	18.2
21	Wed	1:26	17.5	1:06	17.6
22	Thur	2:27	19.2	1:54	17.1
23	Fri	3:26	20.9	2:43	16.6
24	Sat	4:24	22.3	3:39	16.2
25	SUN	5:22	23.3	4:35	15.8
26	Mon	6:16	24.0	5:37	15.8
27	Tues	7:13	24.1	6:43	15.7
28	Wed	8:07	23.9	7:48	15.7
29	Thur	8:59	23.4	8:57	15.7
30	Fri	9:52	22.6	10:04	15.9
31	Sat	10:42	21.5	11:14	16.3

LOW Tides NUSHAGAK District

MAY 1986

1	Thur	3:25	2.2	4:39	3.6
2	Fri	4:26	1.0	5:25	2.9
3	Sat	5:30	0.4	6:27	2.2
4	SUN	6:29	1.9	7:19	1.6
5	Mon	7:31	2.4	8:08	1.1
6	Tues	8:30	4.7	8:54	0.8
7	Wed	9:29	5.7	9:36	0.7
8	Thur	10:26	6.4	10:17	0.8
9	Fri	11:22	6.8	10:59	1.0
10	Sat	12:13	7.1	11:38	1.2
11	SUN			12:59	7.2
12	Mon	0:17	1.4	1:45	7.2
13	Tues	0:57	1.5	2:27	7.1
14	Wed	1:37	1.7	3:09	6.8
15	Thur	2:18	1.9	3:48	6.5
16	Fri	3:03	2.2	4:29	5.9
17	Sat	3:48	2.6	5:08	5.1
18	SUN	4:40	3.2	5:48	3.9
19	Mon	5:33	3.9	6:29	2.5
20	Tues	6:29	4.7	7:09	1.0
21	Wed	7:31	5.4	7:51	-0.6
22	Thur	8:33	6.0	8:40	-2.1
23	Fri	9:36	6.3	9:30	-3.3
24	Sat	10:36	6.3	10:22	-4.1
25	SUN	11:36	6.1	11:18	-4.5
26	Mon			12:35	5.6
27	Tues	0:13	-4.3	1:33	5.0
28	Wed	1:12	-3.6	2:29	4.2
29	Thur	2:11	-2.5	3:25	3.3
30	Fri	3:08	-1.1	4:20	2.3
31	Sat	4:09	0.6	5:13	1.4

HIGH Tides NUSHAGAK District

JULY 1986

1	Tues	0:04	17.4	11:39	17.7
2	Wed	1:04	18.0	12:22	16.4
3	Thur	2:00	18.6	1:04	15.2
4	Fri	2:52	19.0	1:45	14.2
5	Sat	3:40	19.3	2:25	13.5
6	SUN	4:23	19.5	3:07	12.8
7	Mon	5:05	19.6	3:50	12.5
8	Tues	5:44	19.7	4:34	12.3
9	Wed	6:20	19.7	5:18	12.2
10	Thur	6:55	19.7	6:09	12.3
11	Fri	7:27	19.6	7:01	12.6
12	Sat	7:59	19.4	8:00	13.3
13	SUN	8:33	19.2	8:57	14.4
14	Mon	9:07	18.8	9:57	15.7
15	Tues	9:45	18.4	10:57	17.2
16	Wed	10:27	18.0	11:57	18.8
17	Thur	11:12	17.7		
18	Fri	0:57	20.2	12:01	17.3
19	Sat	1:54	21.3	12:57	17.0
20	SUN	2:51	22.1	1:55	16.8
21	Mon	3:50	22.6	2:58	16.5
22	Tues	4:43	22.9	4:04	16.3
23	Wed	5:37	22.8	5:13	16.2
24	Thur	6:29	22.4	6:18	16.1
25	Fri	7:18	21.8	7:29	16.2
26	Sat	8:06	20.9	8:36	16.5
27	SUN	8:51	19.8	9:38	17.0
28	Mon	9:36	18.7	10:40	17.4
29	Tues	10:18	17.5	11:39	17.8
30	Wed	11:01	16.4		
31	Thur	0:32	18.3	11:43	15.5

LOW Tides NUSHAGAK District

JULY 1986

1	Tues	5:48	5.6	8:17	-0.4
2	Wed	6:48	6.7	7:03	-0.5
3	Thur	7:46	7.5	7:45	-0.5
4	Fri	8:41	8.0	8:27	-0.3
5	Sat	9:36	8.3	9:09	-0.1
6	SUN	10:28	8.4	9:50	0.2
7	Mon	11:17	8.3	10:31	0.4
8	Tues	11:59	8.1	11:13	0.8
9	Wed	12:44	7.7	11:52	1.2
10	Thur			1:23	7.1
11	Fri	0:34	1.8	2:02	6.2
12	Sat	1:19	2.6	2:38	5.0
13	SUN	2:06	3.4	3:16	3.6
14	Mon	3:00	4.4	4:35	2.0
15	Tues	3:56	5.3	5:35	0.3
16	Wed	4:52	6.2	6:21	-1.3
17	Thur	5:55	6.8	7:07	-2.7
18	Fri	6:55	7.2	7:59	-3.8
19	Sat	7:55	7.3	7:52	-4.5
20	SUN	8:57	7.1	8:48	-4.7
21	Mon	9:56	6.7	9:44	-4.4
22	Tues	10:55	5.9	10:43	-3.7
23	Wed	11:53	5.0	11:39	-2.5
24	Thur			12:46	3.9
25	Fri	0:37	-1.0	1:41	2.8
26	Sat	1:36	0.7	2:32	1.7
27	SUN	2:33	2.4	3:22	0.9
28	Mon	3:32	4.0	4:08	0.4
29	Tues	4:29	5.3	4:53	0.0
30	Wed	5:24	6.4	5:39	-0.1
31	Thur	6:21	7.1	6:24	-0.1

HIGH Tides NUSHAGAK District

SEPTEMBER 1986

Ln#		DOS L/GRN	TIME	AM	FT	TIME	PM
1	Mon	●	2:10	18.4		1:19	14.0
2	Tues	●	2:53	18.4		2:05	14.0
3	Wed	●	3:32	18.3		2:58	14.2
4	Thur	●	4:11	18.2		3:52	14.5
5	Fri	●	4:48	17.9		4:47	15.1
6	Sat	●	5:24	17.6		5:43	16.1
7	SUN	●	6:02	17.3		6:38	17.2
8	Mon	●	6:38	17.0		7:34	18.3
9	Tues	●	7:19	16.8		8:30	19.4
10	Wed	●	8:06	16.6		9:29	20.3
11	Thur	●	8:57	16.6		10:25	21.0
12	Fri	●	9:49	16.6		11:21	21.3
13	Sat	●	10:45	16.6			
14	SUN	●	0:16	21.4		11:47	16.7
15	Mon	●	1:13	21.2		12:49	16.7
16	Tues	●	2:09	20.9		1:56	16.6
17	Wed	●	3:02	20.3		3:03	17.0
18	Thur	●	3:52	19.7		4:06	17.3
19	Fri	●	4:41	18.8		5:10	17.7
20	Sat	●	5:30	17.8		6:10	18.1
21	SUN	●	6:15	16.8		7:06	18.5
22	Mon	●	6:57	15.9		7:58	18.8
23	Tues	●	7:39	15.0		8:47	19.2
24	Wed	●	8:22	14.4		9:35	19.0
25	Thur	●	9:04	14.0		10:18	18.9
26	Fri	●	9:46	13.8		11:03	18.7
27	Sat	●	10:29	13.8		11:47	18.6
28	SUN	●	11:13	13.8			
29	Mon	●	0:32	18.4		12:02	14.0
30	Tues	●	1:13	18.2		12:54	14.2

APPENDIX D. Alaska Board of Fisheries Regulatory Action and Management Policy
Changes for the 1986 Commercial Salmon Fishing Season, Bristol Bay.

Two major topics concerning the Bristol Bay salmon fishery were discussed at the winter Board of Fisheries meeting:

1. The 48 hour transfer requirement; and
2. The Naknek River Special Harvest Area

The new regulations that resulted from these discussions are shown in Appendix E.

APPENDIX E

Chapter 06.

BRISTOL BAY

5 AAC 06.331 (a)(1) and (a)(4) are amended to read:

5 AAC 06.331. GILL NET SPECIFICATIONS AND OPERATIONS. (a)(1) in the Nushagak District,

(A) gill net mesh size may not be less than 6 3/4 inches from May 1 to 9:00 a.m. June 16;

(B) gill net mesh size may not be less than 4 1/2 inches from 9:00 a.m. July 15 through September 30;

(C) gill net mesh size may not exceed 6 3/4 inches during periods established by emergency order for the protection of chinook salmon;

(c)

(4) the east side of the Kvichak Section north of Happy Creek; (In effect before 1984; am 4/28/84, Register 90; am 5/11/85, Register 94; am 7/14/85, Register 95; am ___/___/86, Register ___).

Authority: AS 16.05.251

5 AAC 06.342 is repealed to read:

5 AAC 06.342. VESSEL IDENTIFICATION. Repealed ___/___/86 (See 5 AAC 39.281. VESSEL IDENTIFICATION)

5 AAC 06.360 is added to Article 3 to read:

5 AAC 06.360. NAKNEK RIVER SOCKEYE SALMON SPECIAL HARVEST AREA MANAGEMENT PLAN. (a) The goal of this plan is to achieve Kvichak River sockeye salmon spawning escapement goals, while providing opportunities to harvest Naknek River salmon stocks that are in excess to spawning goals. It is the intent of the Board of Fisheries that salmon in the Naknek-Kvichak District should be harvested in the fisheries that have historically harvested them including the methods, means, times, and locations of those fisheries, using the best biological management techniques and practices. This plan has been adopted to provide management alternatives that can be used by the department when differences in salmon run strengths would preclude the achievement of the goal of this plan using only the fisheries that have historically harvested those salmon.

(b) The department may open, by emergency order, waters of the Naknek River from the Loran line at the upstream edge of the Bumble Bee Cannery Dock upstream to Savonoski when it projects that the sockeye salmon escapement into the Naknek River will exceed 1,200,000 fish and management actions are being taken in the Naknek Section to reduce the harvest of Kvichak River sockeye salmon. When the Naknek River is open, the following apply within the open waters:

(1) no set gill net may exceed 25 fathoms in length;

(2) no set gill net may be set or operated within 150 feet of another set gill net;

(3) no part of a set gill net may be more than 500 feet from the 18-foot high tide mark;

(4) the shoreward end of a set gill net must go dry at low tide;

(5) no more than 50 fathoms of drift gill net may be used to take salmon;

(6) no CFEC permit holder may use more than one gill net to take salmon at any one time;

(7) no vessel may have more than 150 fathoms of drift gill net or 50 fathoms of set gill net on board;

(8) drift gill nets may not be operated shoreward of the offshore end of a set gill net;

(9) no part of a drift gill net may be operated within 150 feet of the side of a set gill net;

(10) the commercial fishery may not be opened during the subsistence fishing periods set out in 5 AAC 01.310 (b)(2);

(11) the line at Savonoski may be adjusted if it is determined that the incidental harvest of chinook salmon is negatively impacting the sport fishery. (Eff. ___/___/86, Register ___)

Authority: AS 16.05.050
AS 16.05.251

5 AAC 06.370 (b),(c),(d),(e), and (f) are amended to read:

5 AAC 06.370. REGISTRATION AND REREGISTRATION.

(b) A CFEC salmon permit holder intending to fish in a district for which the permit holder is not registered shall, at least 48 hours before fishing in the new district, register himself or herself and the vessel for the new district. Reregistration is accomplished by the permit holder, or his or her authorized agent, completing a form provided by the department and submitting the completed form, in person, to an authorized representative of the department. The 48-hour notification period starts when the reregistration form is signed by the authorized representative of the department. The permit holder and the vessel may not fish in the original district during the 48-hour notification period. The notification period may be reduced by commissioner's announcement. District reregistration is not required after 9:00 a.m. July 17.

(c) After use of either drift gill net or set gill net gear, use of the other type of gear is not permitted until 48 hours, or a reduced period specified by commissioner's announcement, have elapsed following notification to the department of the type of gear intended to be used. After 9:00 a.m. July 17, changing to either drift gill net or set gill net gear may be done without notification to the department of the type of gear intended to be used.

(d) Notification of a change in gear types may be made with the local representative of the department between the hours of 8:00 a.m. and 9:00 p.m. or other times as the representative may be available, and may be accomplished in person or by radio or through a designated representative of the fisherman. However, the 48-hour notification period or a reduced period specified by commissioner's announcement does not begin before the time that notification is received and noted by the department.

(e) A person may not relocate a set gill net site or sites within a district until that person has notified a local representative of the department. Relocation may start immediately after notification, except that in the Nushagak District, relocation cannot start until 48 hours after notification to the department. For the purposes of this section, "relocation" means any change of location of a set gill net that will require movement of the inshore marker required by 5 AAC 06.334(b).

(f) The commissioner shall waive or reduce the 48-hour district transfer notification period required by this section when continuous commercial fishing is being allowed in that district. The commissioner may reimpose the 48-hour notification period at any time when needed for management purposes. (In effect before 1983; am 4/16/83, Register 86; am 5/11/85, Register 94; am ___/___/86, Register ___).

Authority: AS 16.05.251

APPENDIX F. Inshore forecast of king salmon returns by age class to the Nushagak and Togiak Districts, in thousands of fish, 1986.

District	Age Class				Total Run	Escape. Goal	Projected Harvest
	4(2)	5(2)	6(2)	7(2)			
NUSHAGAK 1/	32	70	73	8	183	75	108
% Age Class	17%	38%	40%	4%			
TOGIK 2/	8	15	12	4	39	15	24
% Age Class	21%	38%	31%	10%			

FORECAST METHODS

The 1986 king salmon forecast was based upon the relationship between returns of sibling age classes (i.e., age classes produced from the same spawning escapement). Standard linear regression techniques were used to estimate returns, calculate standard deviations, and provide 80% confidence intervals (ranges) for each major age class. These results were summed to provide the total return estimate.

- 1/ The 1986 forecasted king salmon return to the Nushagak District of 183,000 is 6% greater than the long-term (19 year) average, but is 23% less than recent year (1976-84) average returns. Commercial harvests are expected to approach the 108,000 mark which is slightly less than the recent year (1976-84) average return, contributing 40% and 38%, respectively. The remainder will be comprised of age 4(2) (17%), and 7(2) (4%) fish.
- 2/ The 1986 king salmon forecasted return to the Togiak District of 39,000 is 27% less than the average returns for recent years (1976-84). At this magnitude commercial harvests are only expected to reach the 24,000 level. which is down from the average 31,000 fish caught per year since 1976. Age 5(2) (38%) are expected to dominate the Togiak District return while the 6(2) age class is expected to contribute 31%. The remainder of the return will be comprised primarily of 4(2) (21%), and 7(2) (10%) fish.

APPENDIX G. Inshore forecast of pink salmon returns to Nushagak District.

PRELIMINARY FORECAST OF 1986 RETURN:

NATURAL PRODUCTION -----	Point -----	Range -----
Return Estimate:	4.1 million	1.4 to 7.3 million
Escapement Goal:	1.0 million	
Harvest Estimate:	3.1 million	0.4 to 6.3 million

FORECAST METHOD

Recent forecasts of Nushagak River pink salmon runs, which are of commercial significance only in even-numbered years, have been very inaccurate. In 1982, over 9 million pinks were expected; the actual return was less than 3 million. The 1986 forecast, in contrast to the more elegant but patently less successful methods employed in 1982, is a simple average of returns resulting from parent years having large escapements.

DISCUSSION OF THE 1986 FORECAST

The 1986 parent year escapement of pink salmon in the Nushagak systems in 1984 was quite large (2.9 million fish). Returns per spawner from years of similarly large escapements (1958, 1966, 1968, 1978, 1980 and 1982) have averaged 1.39. The average return in the six years listed above was 5.7 million pinks. The point forecast of 4.067 million pinks is derived using return per spawner data from the above six years of large similar-sized escapements. The expected range of the 1986 return would show a low range of 1.4 million to a high of 7.3 million pinks. Pink production in Nushagak District has been well above long-term trends since the 1978 brood year. The point forecast will allow a commercial harvest of 3.1 million pinks, which would be double the long-term average catch of 1.5 million.

APPENDIX H. SOUTH UNIMAK AND SHUMAGIN ISLANDS JUNE FISHERY MANAGEMENT PLAN,
1986.

The Alaska Board of Fisheries has placed additional restrictions on the South Unimak and Shumagin Islands June fishery during the 1986 season. These restrictions were felt necessary to protect anticipated weak runs of fall Yukon chum salmon and will be used during the 1986 season only.

Additional restrictions are as follows:

1. A 400,000 ceiling placed on the number of chum salmon that can be taken.
2. No fishing prior to June 11. Consequently, there will be only one day in which the June 1-11 sockeye guideline harvest levels can be taken.
3. No fishing during the June 26-30 period, the sockeye guideline harvest levels during this period have been eliminated.

Weekly guideline harvest levels of sockeye salmon based on the Bristol Bay forecast as of March 11, 1986. The forecast and guideline harvest levels are subject to change.

<u>Period</u>	<u>South Unimak</u>	<u>Shumagin Islands</u>
June 11	5% (45,000)	9% (18,000)
June 12 - 18	29% (263,000)	28% (56,000)
June 19 - 25	51% (463,000)	41% (82,000)
June 26 - 30	NO FISHING	
Total	85% (771,000)	78% (156,000)

The total sockeye guideline harvest level for South Unimak and the Shumagin Islands is 6.8% and 1.5%, respectively, of the 1986 inshore Bristol Bay sockeye catch forecast minus the percentage given up during June 26-30.

APPENDIX H. (continued)

The 400,000 chum salmon ceiling applies to both fisheries (South Unimak and Shumagins) as one. It may be necessary to not open specific portions of the area if it is determined that chum salmon catch per sockeye ratios in such location(s) are significantly greater than the balance of the area or if it is likely that the chum salmon catch ceiling of 400,000 will be exceeded with the entire area being open.

There may not be more than 96 hours of fishing allowed during any seven day week and no more than 72 consecutive hours of fishing at any time. The fishery must be closed for at least 24 hours following any opening of 72 consecutive hours. The timing of open and closed fishing periods should be set so there is no excessive impact on any segment of the runs. It is the preference of the Board that no more than 48 consecutive hours be allowed unless circumstances such as weather or attainment of weekly guideline harvest levels require 72 consecutive hours of fishing.

Weekly fishing periods will be announced by field emergency order, and they will be adjusted to keep the sockeye salmon harvest within the weekly guidelines and the total chum salmon harvest under 400,000 fish. If catches fall below the guidelines for a given weekly period, those unharvested sockeye will not be added into a subsequent weekly period. If guideline harvest levels are inadvertently exceeded during any given fishing period, the excess sockeye will be subtracted from the following period.

The first fishing period for both South Unimak and Shumagin Islands fisheries will run from 12:01 a.m. until 12:00 p.m. midnight during June 11. The catch rates during June 11 will be a major factor in determining when and for how

APPENDIX H. (continued)

long the next fishing period will be. If the catch rates are high, fishing periods can be expected to be considerably less than 24 hours.

If catch rates are low and fishing time must be maximized, extensions of fishing time may be made with within only several hours prior to the originally scheduled closure. The fishery may be closed on short notice if the weather is such that only a very small segment of the fishing fleet can fish, and the fishing time is needed to achieve the guideline harvest levels when the weather is good.

ANNUAL MANAGEMENT REPORT

BRISTOL BAY HERRING, HERRING SPAWN ON KELP AND CAPELIN FISHERIES

1986

INTRODUCTION

The Bristol Bay herring sac roe fishery began in 1967 and was followed by the spawn on kelp fishery in 1968. The capelin fishery did not really develop until 1984, but small commercial deliveries date back to the 1960's. For the first 10 years effort levels and the number of processors remained small and the herring sac roe fishery did not operate in 1971 and 1976, due to poor market conditions.

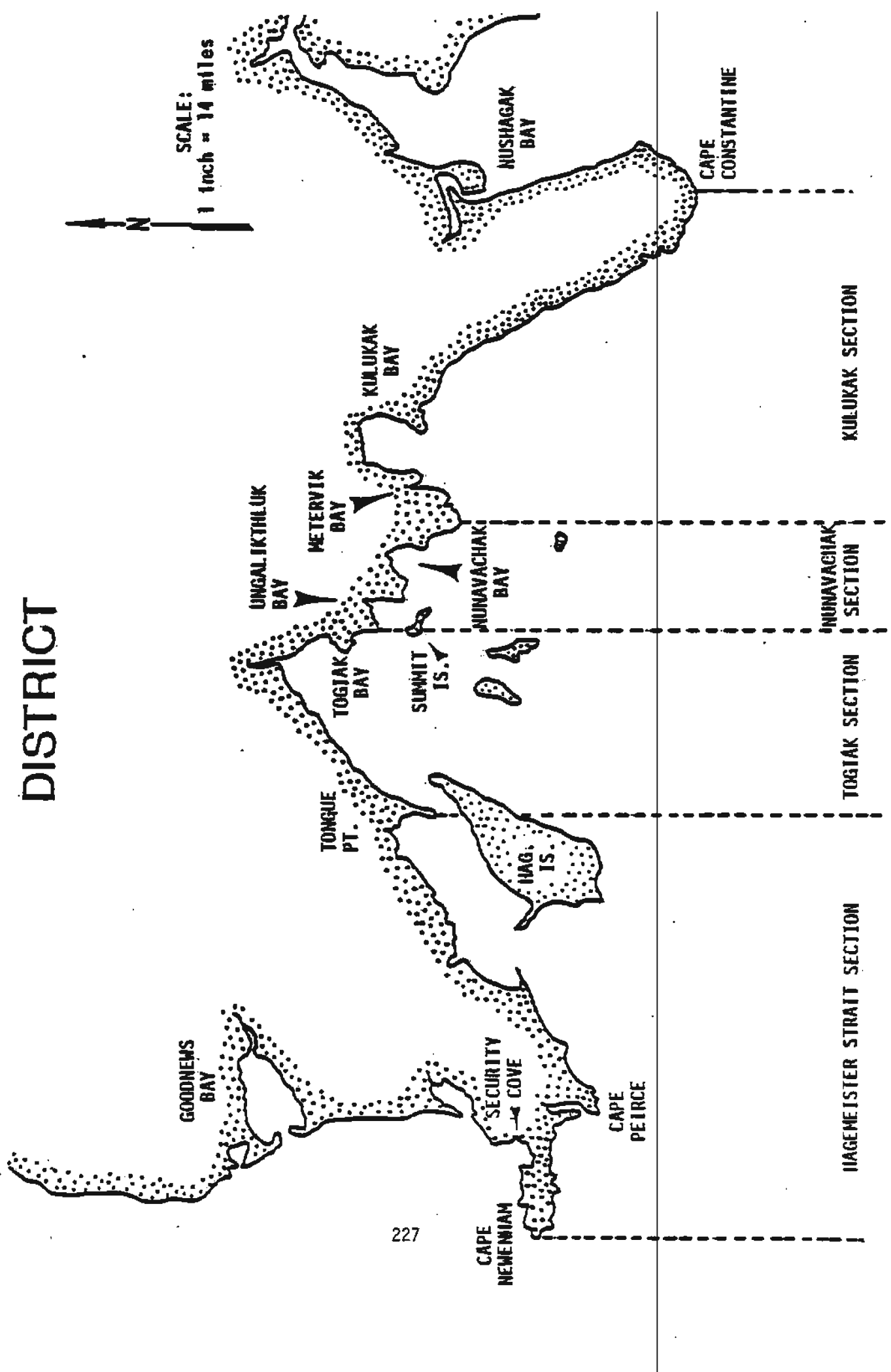
Favorable market conditions and additional incentives provided by the Fishery Conservation and Management Act of 1976 (the 200 mile limit) resulted in a major expansion of the Togiak herring fishery in 1977.

Herring have been reported in all districts of Bristol Bay, but the major concentration occurs in and around Togiak, where the commercial fishery is centered (Figure 1). Legal gear types include purse seines and hand purse seines, which are limited to 150 fathoms in length, and gill nets which are also limited to 150 fathoms, but two permit holders may both operate that amount of gear from a single vessel. The spawn on kelp harvest method is limited to hand picking or by hand held rakes.

Since 1981, the herring and herring spawn on kelp harvests have been regulated by emergency order, and the designated season occurs from April 25 to June 1. A regulatory management plan, 5 AAC 27.865, and a management directive to the staff, set the policies by which this fishery is managed (Appendix A).

Figure 1.

TOGIAK HERRING FISHING DISTRICT



The spawn on kelp management plan was revised prior to the 1984 season and sets the maximum allowable harvest at 350,000 pounds (Reference Spawn on Kelp Plan, Appendix C, Page 225, Annual Management Report, 1984, Bristol Bay). The new plan further directs that the herring spawn on kelp harvest be included in calculating the total exploitation on this stock.

Because the capelin fishery is new and developing, few regulations restrict this activity and the management plan for this species mainly addresses additional protections for herring (Reference Capelin Plan, Appendix D, page 213, Annual Management Report, 1982, Bristol Bay).

1986 Inseason Herring/Kelp/Capelin Management

In late winter, various herring processors were predicting good prices for the 1986 season. This was based on improved prices in the San Francisco fishery in December, and general interest by herring marketing representatives. For the past several years concerns have been expressed about the potential impact of the strong North Atlantic stocks on the herring roe market. However, interest remained strong for Togiak herring due to their extremely large body size. Most Togiak herring roe skeins are graded extra, extra large and are unique in the world market.

Many processors indicated, prior to the 1986 season, that they planned an expanded herring operation at Togiak, with additional fishing boats, tenders, and processing capacity. Two commercial operators also described their plans to purchase a "significant" quantity of capelin because a low catch in Norway had created an expanded market for that species.

By March 26, Kulukak Bay was ice free, and little shore ice was present at any location in the Togiak District. However, a late cold snap dropped temperatures to -10°F in Dillingham on April 7. On April 17, temperatures began to

rise, and averaged +20 to 30 at night and 40 to 42 during the day. Kodiak and Cold Bay were also quite warm and were reporting temperatures in the 40's. As early as April 21 all of the bays near Togiak were ice free and some sea birds were sighted on the grounds. However, some pack ice was still visible offshore.

The first aerial survey of the season was completed on April 24 and good numbers of gulls, and a pod of seals were observed in Metervik Bay, but no herring were sighted. The Summit Island camp was deployed on April 28. The water temperature in the surf was 30.2°F and many California grey whales were observed migrating through the area. On April 29 a major processing ship traveled north from Akutan to Nushagak Bay and encountered no ice enroute.

By May 1, all three of the Department's herring camps were operational. Air temperatures were rising to +50 during the afternoon and many birds and sea mammals were present in the area. On May 4, four herring were caught near the Tongue Point camp using a variable mesh gill net, and morning water temperatures were averaging 33°F. The first herring sighted on an aerial survey were observed on May 7 between Anchor Point and Togiak cannery, with a few additional schools near Hagemeister Spit. Gill net test boats were deployed that same day but only a few scattered herring were landed. A commercial spotter reported "hundreds of schools" on both sides of Tongue Point the same evening, but aerial surveys were severely limited from May 8 to 10 due to snow, wind and overcast conditions, and the report was never confirmed.

On May 8, a listing of all Bristol Bay (Area T) permit holders, was requested from the Commercial Fisheries Entry Commission and documented that 325 purse seine, 684 gill net, and 444 kelp permits had been issued. The first 100 herring were aged on May 10 and 32% were age 8 and 47% were age 9+, closely matching the preseason projection. High winds and cold temperatures (34°- 35°F) limited test

fishing efforts, but a sample of gill net caught herring obtained on the west side of Kulukak Bay on May 11 tested 10.2% mature roe.

Approximately 5,000 tons of herring were visible on the May 12 aerial surveys, so test fishing efforts were increased, and purse seine vessels were employed in addition to the gill netters. Herring were obtained from several locations and because some ripe fish were present, several bags were dropped off at commercial processors for formal roe testing. Roe recoveries ranged from 0% mature in Nunavachak to 1.2% mature in the Metervik Bay samples. Test fishing efforts were increased and on May 13, ten vessels were deployed. Most of the herring were still green and the samples ranged from .1% to 8.6% mature. Aerial surveys accounted for 30,000 tons of herring in the area, and the vessel count on May 13 totaled 100 gill netters and 156 purse seiners. The first spawns of the season were also reported in the area south of Mudd Bay, near Pinnacle Rock, in Ungalikthluk Bay, and near Rocky Point.

On May 14, 13 test boats were deployed (nine purse seine and four gill netters). The vessels were dispersed throughout the district: two west of Tongue Point, four in Togiak Bay, three in Nunavachak and four in Kulukak, in order to get a comprehensive sample of the age composition, and maturity of the roe. Several large spawns were visible on the morning of May 14 and herring were observed moving to the beach in good volume from Eagle Bay to Rocky Point.

At 12:00 noon, May 14, the fleet was advised that fishing time was imminent. All practice sets were terminated and all vessels were advised to standby at 3:00 p.m. for an informational announcement. It was further announced that the gill net fleet would fish first per the Board of Fisheries approved management plan. The purse seine fleet was advised to standby. Test boat samples were taken to Nunavachak beach where a total of 21 different bags of fish were publicly

sampled for roe maturity. Roe recoveries ranged from .5% mature to 16.4% mature and averaged 8.3%, the best ever recorded prior to a commercial fishery. The age composition of the samples closely matched the preseason projection and was composed of large, older age herring. Clearly it was time to fish and at 3:00 p.m. an announcement was broadcast on marine VHF radio for a five hour fishing period for the gill net fleet from 5:00 p.m. to 10:00 p.m., May 14. It was further announced that a purse seine opening was anticipated for 6:00 a.m., May 15, but that the fleet should standby at 5:00 a.m. for an official time check, a confirmation of the starting time and the length of the opening.

Gill net roe recoveries were excellent and heavy fishing was observed in the area between Rocky Point and Anchor Point, on the gravel beach northeast of Summit Island, and on the west side of Kulukak Bay. A total of 209 gill net vessels were observed fishing, on a low level aerial survey with the Department's chartered helicopter. Skies were clear on the morning of May 15, with light breezes. With no anticipated weather problem, and good visibility at all three camp locations, a time check was issued at 5:00 a.m., followed by an announcement for a 1/2 hour purse seine fishery from 6:00 a.m. to 6:30 a.m. To delay the seine opening until the afternoon low tide would have resulted in a significant loss of roe recovery due to a high incidence of spawnouts, but to open at, or near, high water would have resulted in a dangerous situation with vessels stranded in some areas for almost 24 hours. As a compromise, the opening was scheduled for three hours before high water in the hope that it would allow enough time for the fleet to reach deep water before the tide fell too far. On a helicopter survey of the fishery, a total of 209 purse seine vessels were observed, 172 of which were west of Tongue Point. At that time the estimated tender capacity on the fishing grounds was approaching 24,000 tons, and with

the large, efficient fleet, only short openings could be allowed to keep the anticipated harvest within the desired 10% to 20% exploitation rate.

Roe recoveries were quite high, and by 11:00 a.m. the gill net harvest from the first opening was estimated at 1,660 tons. The purse seine catch was just over 5,100 tons and building slowly, therefore the total harvest was roughly 7,000 tons. The herring biomass was approaching 70,000 tons, so the exploitation rate of approximately 10% was still well within the optimum range of 10 to 20%. With a harvestable surplus of herring still available, and the majority of the fish at the peak of maturity, any delays could have resulted in a major loss of roe recovery.

Due to circumstances with the tide at the time, the staff elected to allow the purse seine fleet to precede the gill netters on the second opening. The large holdup low tide in the afternoon did not pose a major problem for the purse seine fleet, although a delay for seven hours to allow the gill net harvest first, would have reduced roe recoveries. Scheduling the gill net opening near the start of the flood would allow the nets to be recovered more easily and improve the roe recovery as the tide brought the spawning herring to the beach.

At 12:00 noon, May 15, the second and final opening was announced for a 1/2 hour purse seine period from 2:00 p.m. to 2:30 p.m., followed by a five hour gill net opening from 3:00 p.m. to 8:00 p.m. The resultant harvest was surprisingly strong, with over 9,000 tons of herring landed by the two gear types on the second opening.

Fleet efficiency increased tremendously in 1986. The overall purse seine catch per vessel per hour of fishing time averaged 61.2 s.t. compared to 45.5 s.t. and 6.6 s.t. in 1985 and 1984, respectively. The overall gill net catch

per vessel per hour of fishing time averaged 1.7 s.t., while in 1985 and 1984 it was 1.3 and 0.5 s.t., respectively. The increased fleet efficiency was attributed to several factors including a few days of good weather, large volumes of herring in near shore areas, rapid roe maturation across the entire district, and increased experience by fishermen.

By the evening of May 15, it was evident that the fishery was at, or near, the 20% exploitation level. Herring were already moving out of the district in an easterly direction along the Nushagak Peninsula and following the traditional exit pattern of spawned out fish. With the on-grounds herring biomass decreasing due to the departure of spawned out fish, and with few younger herring in the age samples, it was announced as early as May 17, that further fishing time was unlikely for the 1986 season.

Good weather on May 17 allowed resumption of Department test fishing activities. Several purse seine sets were landed to calibrate estimated surface area of herring schools with actual tonnage (Appendix Table 1). The Fish and Wildlife Protection Division surveyed the district with the helicopter for lost or abandoned gill nets. Very few nets were found and the number of vessels fishing after the closures was much reduced from previous seasons.

The first capelin were landed on May 17, with two small deliveries in the Kulukak Section (Table 6). Sampling of the spawn on kelp areas was initiated to locate the best sites for a potential harvest. A public meeting with the three registered kelp buyers and interested harvesters was held on the beach near Anchor Point to display the samples collected by the staff and to discuss a possible opening. By May 17 spawning was well distributed throughout the Togiak District, and a total of 56.2 linear miles of herring milt had been observed on the aerial surveys. When the samples were examined, the egg deposition in area

K-8 (Figure 2) was deemed to be of adequate coverage to be marketable, and no evidence of silt pollution was found. An emergency order was issued for a six hour opening from 3:00 p.m. to 9:00 p.m. on May 18, in area K-8. The harvest was restricted to one area per the Board approved kelp management plan, in an attempt to reduce the damage to unharvested spawn and plants as well as overall impact on the plant community.

The resultant harvest of 88,000 lbs. was reported as good quality product, with none rejected by the buyers. A total of 191 harvesters, employing 69 skiffs participated. With approximately 75% of the 350,000 lb. quota still available, and a lower tide to expose more salable plants, an additional six hour opening was scheduled for May 19. A slight increase in effort was observed on the second opening, with 204 harvesters and 77 skiffs participating.

The harvest from the second opening totaled just over 117,000 lbs., which brought the cumulative total to roughly 205,000 lbs. or 59% of the quota. It was noted that the product quality had begun to slightly deteriorate, so when the third opening was announced for May 20th, the western 1/2 of area K-7 was included with K-8 to increase the opportunity to find marketable quality spawn on kelp.

Through May 20, the harvest of herring spawn on kelp totaled 277,617 lbs. or 79% of the 350,000 lb. quota. Although the third commercial harvest period included areas K-8 and the western portion of K-7, the product in K-7 was not commercially marketable due to low egg coverage, and because of the large earlier removal from K-8 the quality there was also deteriorating. Samples taken from K-9 the morning of May 21 found fair to poor coverage on the eastern shore, but good quality product on the west side. Technicians from all three buyers confirmed that the product in west K-9 was marketable and that they had the capacity

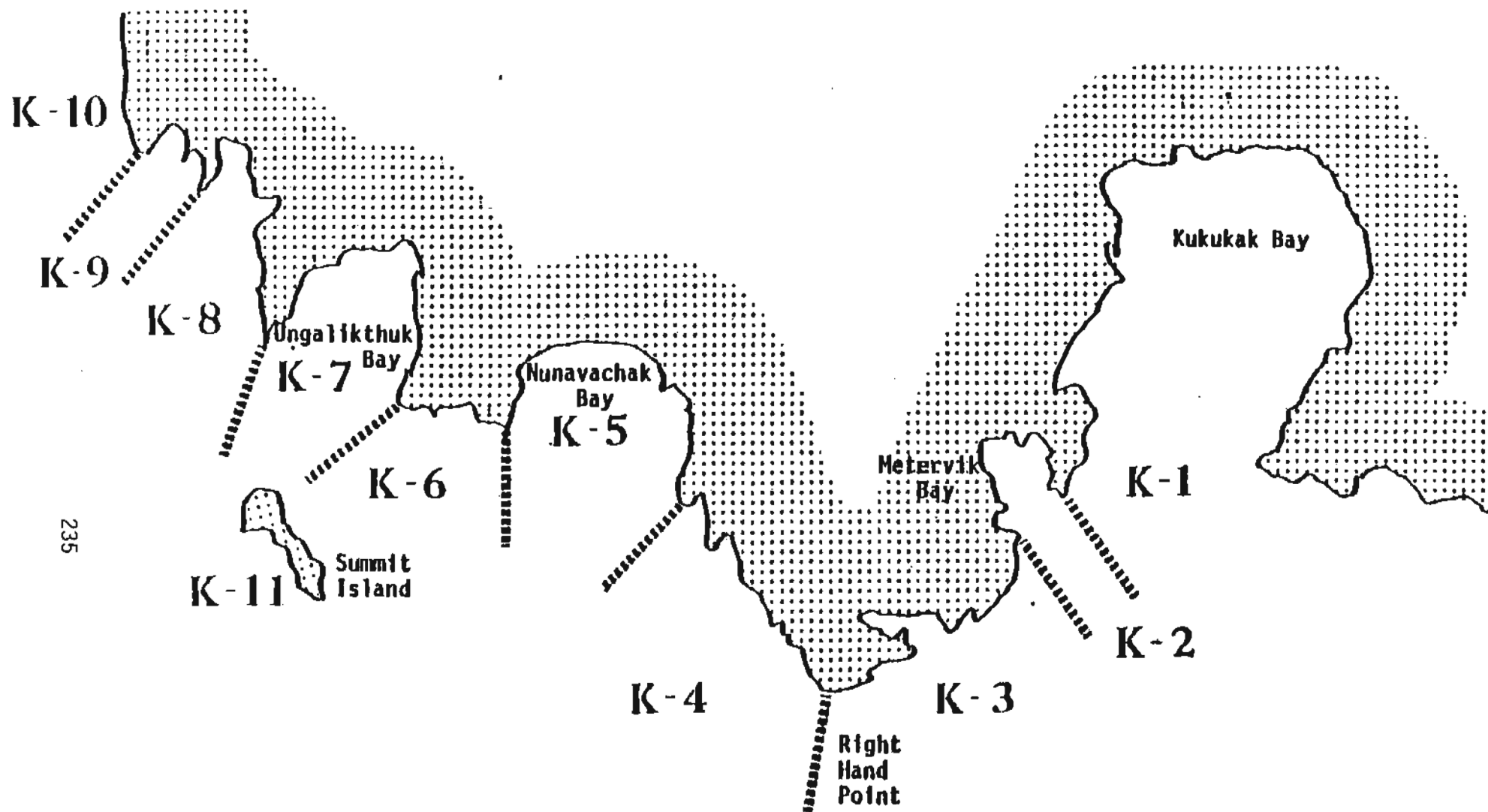


Figure 2.

HERRING SPAWN-ON-KELP MANAGEMENT AREAS (K-1 THROUGH K-11)

and desire to harvest the remainder of the available quota. Due to the lower tide stage (-.6 ft.) and the better egg coverage in K-9, this harvest period was limited to four hours, from 6:00 p.m. to 10 p.m., May 21.

The season total kelp harvest of 374,000 lbs. was approximately 7% over the quota of 350,000 lbs. (Table 5), but within acceptable limits. By deducting 25% of the total weight of the herring spawn on kelp landed for plant weight, the amount of eggs removed was equivalent to the spawn of 1,446 s. tons of herring (Table 5). That amount was added to the herring harvest, per the Board directive, when the overall exploitation rate was calculated.

On May 21 herring were still spawning in the area, especially on Summit Island. Some test boat catches had good roe recoveries, but the herring biomass on the grounds had decreased considerably from the peak abundance estimate, and a small increase in the percentage of younger fish was detected in the age composition. There was considerable agitation by some of the spotters and fishermen for additional fishing time, but with the reduced herring biomass present, the large number of spawn outs throughout the district, the appearance of some younger age herring, and an undetermined amount of capelin in the area, an additional harvest was not seriously considered.

The capelin harvest was terminated on May 22 by the only buyer present, due to mechanical problems at their processing plant. No capelin biomass estimate was attempted, but the volume was clearly less than was observed in 1985, and the individual schools were quite small, requiring many sets to load a single tender.

In summary, the 1986 season went quite well, with an orderly harvest, good roe recovery, and approximately 18.7% exploitation. A total of 23 companies purchased herring during the season, and though the projected biomass and harvest

was less than the previous year's, the size of the tendering and processing fleet had increased to a capacity of over 23,400 st. As a result, the majority of the companies fell short of their production goals for the season.

Purse seine vessels accounted for 79% (12,815 st) of the total landed catch and gillnet vessels accounted for 21% (3,445 st) (Table 3). Two-thirds of the total catch (66%) was taken west of Togiak Bay by purse seine vessels with nearly all of the gillnet catches (99%) taken from Togiak Bay eastward.

A total harvest of 16,142 st (99%) of Pacific herring was purchased for sac roe with 118 st (1%) purchased for food or bait. Roe recoveries varied from 0% immature to a reported high of 16% mature. Average purse seine roe recovery was 9.9% and the average recovery from gill net catches was 8.8%, the highest ever reported for that gear type.

The exvessel value to fishermen was estimated to be \$8.7 million. Prices paid ranged from a low of \$475 per st at 10% recovery to a high of \$700 per st. The average price was \$554 per st for 10% roe recovery with an increase or decrease of \$55 per st for each percentage point above or below 10%. The average price for food and bait herring was \$77 per st with prices ranging from a low of \$50 to a high of \$150 per st.

The estimated prices for sac roe herring are undoubtedly low, because most companies paid a base price on the grounds and an additional post-season settlement upon finalization of the price with the foreign market. An increase of up to 30% of the estimated exvessel value may be more accurate.

Wastage was not a major problem this season. One company reported turning away one small delivery of 3.5 st because of low roe content. This load may have been sorted and sold elsewhere. The number of lost or abandoned gill nets was minimal with the majority of those remaining after the fishery retrieved by Fish

and Wildlife Protection vessels. To account for lost or abandoned gear catch, fishery dead loss, and Department test sampling, a wastage of 50 st was added to the 1986 exploitation. Test fishing was terminated on May 27 and the camps were disbanded on May 28 and 29.

TABLES

Table 1. Summary of herring aerial survey total run estimates and observations of herring spawn, Togiak District, Bristol Bay, 1986.

Date	Survey Rating	Census Area 1/ Surveyed 2/	Number Herring Schools Observed				Herring Biomass Est. 3/4/		Herring Spawn Miles		
			Small	Med.	Large	Total	Formula	Staff	No.	Each	Accum.
4/24	3/4	NUS-MAT									
5/ 1	2/4	NUS-OSV									
5	3/5	NUS-MAT									
7	3	NUS-HAG	12	6	1	19	87	150			
8	4	NUS-TON		1		1	14				
10	5	NUS-TOG									
11	5	NUS-TOG									
12	4/5	NUS-MAT	2	71	18	91	4,149	4,200			
13	3/4	NUS-HAG	5	272	151	428	30,464	30,470	2	0.8	0.8
14 A.M.	3/4	NUS-OSV		50	31	81	2,057	1,500	8	3.0	3.8
14 P.M.	3/4	NUS-HAG		368	817	1,185	65,745	66,850	21	10.8	14.6
15 A.M.	3/4	NUS-PYR		133	89	222	4,853	4,800	20	10.0	24.6
15 P.M.	3/5	NUS-PYR		288	139	427	15,285	14,800	33	8.2	32.8
16 A.M.	3/4	NUS-OSV		17	144	161	15,343	16,000	14	5.6	38.4
16 P.M.	2/3	NUS-PYR		741	301	1,042	38,854	42,300	20	5.5	43.9
17 A.M.	2/4	NUS-PYR							13	7.0	50.9
17 P.M.	2/5	NUS-OSV		558	191	749	29,339	29,400	11	4.7	55.6
18	3/4	NUS-MAT		201	183	384	22,740	25,750	3	0.6	56.2
19	4/5	NUS-TOG		39	63	102	6,144	6,500	1	0.6	56.8
20	3/4	NUS-HAG		308	359	667	26,047	26,900	3	0.6	57.4
21 A.M.	2/3	NUS-HAG		419	214	633	24,195	27,000	4	2.0	59.4
21 P.M.	2/4	NUS-OSV		258	218	476	22,682	19,150	7	2.2	61.6
22	3/5	NUS-OSV		134	44	178	5,034	5,800	4	0.5	62.1
23	3/4	NUS-OSV		256	111	367	18,298	20,560	4	1.5	63.6
24	2/3	NUS-OSV	13	324	34	371	6,142	8,200	11	2.6	66.2
27	3/5	NUS-UNG		173	32	205	4,296	6,900	0	0	66.2
30	3/5	NUS-TOG	19	40	2	61	781	-	3	0.3	66.5
6/ 6	4/5	NUS-UNG		4	1	5	243	-	0	0	66.5

1/ Survey rating: 1 = Excellent; 2 = Good; 3 = Fair; 4 = Poor; 5 = Unsatisfactory.

2/ Inclusive census areas: NUS = Nushagak Peninsula; KUL = Kulukak; MET = Metervik; NUN = Nunavachak; UNG = Ungalikhluk; TOG = Togiak; TON = Tongue Point; MAT = Matogak; OSV = Osviak; HAG = Hagemeister; PYR = Pyrite Point; and CN = Cape Newenham.

3/ Short tons.

4/ Formula: Total RAI's x conversion factors of 1.52, 2.58, and 2.83 tons, by census area and fish density/distribution;

Staff: personal estimates by experienced Department spotters.

(Source: 1)

Table 2. Emergency order commercial herring sac roe and herring spawn on kelp fishing periods, Togiak District, Bristol Bay, 1986.

Emergency Orders 1/

Number	K Area	Date, Time and Gear			Hours Open
<u>I. HERRING SAC ROE</u>					
DLG 01		May 14	5:00 p.m. - May 14 10:00 p.m.	Gill Net	5.0 hours
DLG 02		May 15	6:00 a.m. - May 15 6:30 a.m.	Purse Seine	0.5 hours
DLG 03		May 15	2:00 p.m. - May 15 2:30 p.m.	Purse Seine	0.5 hours
		May 15	3:00 p.m. - May 15 8:00 p.m.	Gill Net	5.0 hours
<u>II. HERRING SPAWN ON KELP</u>					
DLG 04	K8	May 18	3:00 p.m. - May 18 9:00 p.m.		6.0 hours
DLG 05	K8	May 19	3:30 p.m. - May 19 9:30 p.m.		6.0 hours
DLG 06	K8 and western 1/2 of K-7	May 20	4:00 p.m. - May 20 9:00 p.m.		5.0 hours
DLG 07	Western 1/2 of K-9	May 21	6:00 p.m. - May 21 10:00 p.m.		4.0 hours

1/ Prefix code on emergency orders indicate where announcements originated ("DLG" for Dillingham).

(Source: 1)

Table 3. Commercial herring catch and roe recovery by period and gear type, Togiak District, Bristol Bay, 1986.

Period		Hours	Short Tons			Roe Percent 2/		
			Gill Net	Purse Seine	Total	Gill Net	Purse Seine	Total 1/
5/14 p.m. - GN		5.0	1,702			8.7		
5/15 a.m. - PS		0.5		5,398	7,100		9.8	9.5
5/15 p.m. - GN		5.0	1,743			8.9		
5/15 p.m. - PS		0.5		7,417	9,160		9.9	9.7
Total	GN	10.0	3,445			8.8		
	PS	1.0		12,815	16,260		9.9	9.7
Percent of Catch			21.2	78.8	100.0			

1/ Includes herring taken in Department of Fish and Game Test Fish and Research program.

2/ Weighted by catch and gear type.

(Source: 1)

Table 4. Pacific herring catch by fishing period, time, and section, in short tons, Togiak District, 1986.

Period	Time (hours)	Section						Total 1/
		Kulukak	Nunavachak	Togiak	Hagemeister	Pyrite Point	Cape Newenham	
Gill Net								
5/14 p.m.	5.0	635 (37%)	610 (36%)	457 (27%)	0			1,702 (10%)
5/15 p.m.	5.0	927 (53%)	599 (34%)	204 (12%)	13 (<1%)			1,743 (11%)
	10.0	1,562 (45%)	1,209 (35%)	661 (19%)	13 (<1%)			3,445 (21%)
Purse Seine								
5/15 a.m.	0.5	1,474 (27%)	130 (3%)	78 (1%)	1,339 (25%)	2,377 (44%)	0	5,398 (33%)
5/15 p.m.	0.5	1,630 (22%)	741 (10%)	291 (4%)	893 (12%)	3,621 (49%)	241 (3%)	7,417 (46%)
	1.0	3,104 (24%)	871 (7)	369 (3%)	2,232 (17%)	5,998 (47%)	241 (2%)	12,815 (79%)
Combined Gear								
5/14-15	5.5	2,109 (30%)	740 (10%)	535 (8%)	1,339 (19%)	2,377 (33%)	0	7,100 (44%)
	5.5	2,557 (28%)	1,340 (15%)	495 (5%)	906 (10%)	3,621 (39%)	241 (3%)	9,160 (56%)
	11.0	4,666 (29%)	2,080 (13%)	1,030 (6%)	2,245 (14%)	5,998 (37%)	241 (1%)	16,260 (100%)

1/ Wastage not included (50 st).

(Source: 1)

Table 5. Commercial herring spawn on kelp harvest by day and area, in pounds, Togiak District, Bristol Bay, 1986.

Date	Time	Kelping Area			Daily Total	
		K-7 1/	K-8	K-9 1/	Pounds	Short Tons
5/18	6 hrs.	-	88,324	-	88,324	44.2
5/19	6 hrs.	-	117,014	-	117,014	58.5
5/20	5 hrs.	2,468	72,964	-	75,432	37.7
5/21	4 hrs.	-	-	93,372	93,372	46.7
Total	21 hrs.	2,468	278,302	93,372	374,142 2/	187.1

1/ Only the western half of these areas were open to harvest.

2/ By using a formula adopted by the 1984 Board of Fisheries the herring spawn on kelp harvest may be converted to represent herring as follows:

$$\begin{array}{rcl}
 (1986 \text{ Spawn On Kelp Harvest}) & & \\
 - \text{Estimated Plant Weight (25\%)} & & (374,142 \text{ lbs.} - 93,536 \text{ lbs.}) \\
 \hline
 \text{Weight of Eggs Harvested} & \text{or} & \hline
 & & 280,606 \text{ lbs.} \\
 & & \hline
 & & 140.3 \text{ Tons of Eggs}
 \end{array}$$

1986 Average Roe Recovery = 9.7%

$$\begin{array}{rcl}
 9.7\% & 100\% & \\
 \hline
 140.3 & X & \\
 \hline
 & & X = 1,446.4 \text{ short tons of herring.}
 \end{array}$$

This 140.3 tons of eggs was equated to 1,446.4 short tons of herring.

This number (1,446.4 s. tons) was added to the herring harvest and included in calculating percent exploitation.

(Source: 1)

Table 6. Commercial capelin catch by date, in short tons, Togiak District, Bristol Bay, 1986.

Date	Number of Deliveries 1/	Total Catch		Weight After Sorting 2/	
		Daily	Cum.	Daily	Cum.
5/17	2	28.5	28.5	21.4	21.4
5/19	1	16.4	44.9	9.9	31.3
5/21	1	62.8	107.7	37.7	69.0
5/22	1	31.4	139.1	18.8	87.8
Total	5		139.1		87.8

1/ Number of tender deliveries. Approximate number of purse seine sets = 15.

2/ Landed weight has been sorted to recover females for marketing. Sorting recovery of 60% - 75% is estimated.

(Source: 1)

Table 7. Herring total run and commercial catch by year class, Togiak District, Bristol Bay, 1986.

Year Class	Age	Total Run		Catch		Escapement in Short Tons
		Short Tons	Percent	Short Tons	Percent	
1977	9+	29,860	31.5	6,051	37.1	23,809
78	8	37,539	39.6	7,544	46.3	29,995
79	7	16,678	17.6	2,256	13.8	14,422
80	6	3,905	4.1	290	1.8	3,615
81	5	6,248	6.6	169	1.0	6,079
82	4	489	0.5	0	0.0	489
83	3	51	0.1	0	0.0	51
<hr/>						
Total		94,770	100	16,310 1/	100	78,460

1/ Includes an estimated 50 tons of waste.

(Source: 1)

Table 8. Commercial herring sac roe and herring spawn on kelp processors and buyers operating in Togiak District, Bristol Bay, 1986. 1/

Name of Operator/Buyer	Base of Operations	Processing Method		Brine Export	Comments
		Frozen	Cured		
A. HERRING SAC ROE					
1. Alaska Herring Corp.	M/V Ebiu Maru #88	Floater			13 Freezer vessel fleet.
2. All Alaskan Seafoods	M/V Northern Alaskan	Floater			
3. Blue Pacific Industries	M/V Tuxedni	Floater			M/V Double Star Ekuk plant.
4. Bristol Monarch	M/V Bristol Monarch	Floater			
5. Chignik Pride Fisheries	M/V Sea Fisher			Sea	Tender to Chignik for processing.
6. Dutch Harbor Seafoods	P/V Omnisea	Floater		Sea	Some tendered to King Cove and Pt. Moller.
7. Icicle Seafoods	P/V Arctic Star	Floater			
8. JX Fisheries	M/V Alaska Packer	Floater			
9. Kemp Pacific Fisheries	M/V Bering Trader	Floater		Sea	Tender to Dillingham.
10. Kemp Paulucci Seafoods	Togiak Plant				Stripping at Togiak plant.
11. King Crab, Inc.	M/V Viva-Yo			Sea	Tender to Naknek & Kodiak.
12. Lafayette, Inc.	M/V Pribilof	Floater			
13. Mukluk Fisheries	M/V Yardarm Knot	Floater			
14. New West Fisheries	M/V Polar Ice	Floater			
15. Northcoast Seaf. Proc.	M/V Polar Bear	Floater			
16. Peter Pan Seafoods	M/V Gayla Maureen			Sea	Tender to Pt. Moller and King Cove.
17. Seward Marine Services	M/V Sno Pac Alaska	Floater		Sea	Tender to Seward.
18. Trident Seafoods	P/V Neptune	Floater		Sea	Tender to Akutan.
19. Togiak Fisheries, Inc.	Togiak Cannery	Shore			
20. Togiak/Nuka Point	Togiak Cannery	Shore		Sea	Tender to Togiak and Pederson Pt.
21. Victoria M Ltd.	M/V Victoria M	Floater			
22. Western Sea Producers	M/V Nicolle N	Floater			
23. Woodbine Ak. Fish Co.	M/V Woodbine	Floater			
TOTAL		20		8	
B. HERRING SPAWN ON KELP					
1. Kemp-Paulucci Seafoods				Shore	
2. Northcoast Seaf. Proc.				Floater	
3. Togiak Fisheries				Shore	
TOTAL				3	

1/ Operators with a processing facility in the district or operators from other areas buying herring or kelp and providing tender and support service for fishermen in areas away from the facility.

APPENDIX TABLES

Appendix Table 1. Aerial estimates of surface area and tonnage conversion of herring schools, in the Togiak District, Bristol Bay, 1978-86.

Year	Date	Estimated Tons Per 538 sq. ft. 1/	School Size (Feet)	Weight of Catch (Short Tons)	Actual or Est. Weight of Catch	Fish Maturity	Location of Purse Seine Set	Water Depth in Feet
1978	5/13 18	7.39 12.13	80 x 60	2/ 110	Estimated Estimated	2/ 2/	Nunavachak Bay Nunavachak Bay	2/ 2/
1979	5/ 4	2.65	40 dia.	6	Actual	Ripe	Ungalikthluk Bay	20
1980	5/15 15 16 16	1.32 1.76 1.21 3/ 1.32	60 x 40 40 x 30 220 x 50 65 x 20	6 4 21 3	Actual Estimated Actual Estimated	Ripe Spawn-outs Spawn-outs Fish lost	Ungalikthluk Bay Ungalikthluk Bay Nunavachak Bay 1 Mile West	10 26 16 16
	20 20	3.31 2.87	70 x 70 150 x 75	30 59	Estimated Estimated	Ripe Fish lost	East of Eagle Bay Eagle Bay	16 20 20
1981	5/ 3 8 10	1.21 1.87 4.41	400 x200 80 x 30 150 x 60	88 8 44	Actual Actual Actual	Ripe Spawn-outs Ripe	West Side, Tongue Pt. Togiak Bay, Mouth Asigyuapak Spit Bight	7 20 26
1982	5/15	2.09	200 x150	110	Estimated	Green	Kulukak Bay	26
1983	4/30 30 30 5/11	1.21 1.10 1.65 1.98	150 x 80 350 x143 60 x 30 200 x200	60 100 3 140	Estimated Estimated Estimated Estimated	Green Green Green Ripe and Spawn-outs	Togiak Bay Togiak Bay Togiak Bay Togiak Bay	13 10 26 10
	18 18	1.87 2.43	300 x 50 60 x 60	50 15	Estimated Estimated	Spawn-outs Spawn-outs	Nushagak Peninsula Nushagak Peninsula	13 13
1986	5/17 17 5/19 19 5/20 5/21	2.15 5.38 1.15 1.12 1.08 11.86	100 x100 100 x 30 100 x 50 100 x100 100 x100 70 x 70	40 55 11 21 20 108	Estimated Estimated Actual Actual Estimated Actual	Spawn-outs Spawn-outs Ripe Ripe Spawn-outs/ Immature Ripe	Togiak Bay West Side, Tongue Pt. West Side, Kulukak Bay West Side, Kulukak Bay East Side, Tip of Hagemeister Is. Gravel Beach, Nunavachak Section, N. of Summit Is.	13 17 8 10 12 5

1/ Surface area for each school is expressed as a multiple of 538 sq. ft. or 50 sq. m. This is the maximum area of a "small" school and is equal to one relative abundance index (RAI).

2/ Incomplete data.

3/ Average of 2 observers' estimates.

Appendix Table 4. Age composition of the inshore herring run, Togiak District, Bristol Bay, 1977-86.

Year	Age Composition (%) 1/							Catch (S.T.)	Total Run 2/ (S.T.)
	3	4	5	6	7	8	9+		
1977	4	49	37	3	3	3	1	2,795	-
78	11 3/	44	33	9	1	1	1	7,734	190,292
79	3	9	43	35	9	+	1	11,558	239,022
80	3	2	2	39	37	15	2	24,586	68,686
81	2	48	5	1	25	15	4	12,572	158,650
1982		16	56	3	1	13	11	21,869	97,902
83		4	33	47	2	2	12	26,887	141,782
84		2	8	32	40	5	13	19,470	114,880
85		5	3	8	29	41	14	25,866 4/	131,400
86			7	4	18	40	31	16,310 5/	94,770

1/ Age composition in 1977-78 based on number samples, and not weighted by weight at age and aerial biomass estimates; while age composition in 1979-86 is weighted by weight at age and aerial biomass estimates.

2/ Includes commercial catch plus escapement.

3/ Includes age 1, 2 and 3.

4/ Includes 250 s.t. waste.

5/ Includes 50 s.t. waste.

(Source: 1)

Appendix Table 5. Commercial harvest of herring spawn on kelp in the Togiak District, Bristol Bay, 1968-86.

Year	Number of Processors	Number		Harvest Pounds
		Fishermen	Deliveries	
1968	1	1	6	54,600
69	1	3	20	10,125
70	1	5	23	38,855
71	1	12	43	51,795
72	1	12	32	64,165
1973	1	10	11	11,596
74	3	26	49	125,646
75	2	44	98	111,087
76	5	49	118	295,780
77	5	75	266	275,774
1978	11	160	349	329,858
79	16	100	228	414,727
80	21	78	186	189,662
81	7	108	277	378,207
82	8	214	167	234,924
1983	4	125	257	270,866
84	6	330	412	406,587
85 1/				
86	3	204	351	374,142
18 Year Total	97	1,556	2,893	3,638,396
1968-77 Total	21	237	666	1,039,423
1978-86 Total	76	1,319	2,227	2,598,973
18 Year Average	5	86	161	202,133
1968-77 Average	2	24	67	103,942
1978-86 Average	10	165	278	324,872

1/ Fishery not conducted.

(Source: 1)

Appendix Table 6. Aerial observations of herring spawns in the Togiak District, Bristol Bay, 1978-86. 1/

Date	1978		1979		1980		1981		1982		1983		1984		1985		1986	
	No.	Miles	No.	Miles	No.	Miles	No.	Miles	No.	Miles	No.	Miles	No.	Miles	No.	Miles	No.	Miles
4/30			2	2.5			9	3.0			0							
5/ 1	1	0.4					6	2.3			0							
2			21	8.3	11	4.0	12	1.9			10	3.6						
3	1	0.4	14	5.0	8	3.0	12	6.8			30	9.3						
4			8	3.1			4	2.9			40	12.5						
5			1	1.3	0		6	2.5			27	7.5						
6					3	0.9	0				8	2.9						
7			3	0.6	3	1.2	2	0.4	0		8	1.5						
8	2	1.8			1	0.2	3	1.0			8	1.9						
9			2	0.4			5	1.4					1	+				
10			0				0		0									
11	9	7.7			0						3	3.5						
12	3	1.5	0		0		15	4.8	0		9	5.4						
13	12	8.6			0		6	3.8	0		0						2	0.8
14	11	5.6	0		2	2.3	10	4.7	0								29	13.8
15					6	4.0	2	1.5	0		2	1.0					53	18.2
16			0		4	1.2	0		1	0.1	4	0.5	1	0.3			34	11.1
17			0						4	0.7	9	2.0	1	0.5			24	11.7
18	11	4.2							29	7.3	19	6.1	24	17.6			3	0.6
19	3	2.5			1	0.3			16	5.2	7	1.7	71	24.6			1	0.6
20					4	0.9			19	14.0	0		8	1.3	3	0.2	3	0.6
21			0						3	2.0			0		8	2.0	11	4.2
22					2	0.5			3	1.5			5	1.2	13	2.3	4	0.5
23							10	2.1	11	3.3	0		3	1.4	48	14.2	4	1.5
24									5	1.4			6	2.2	25	11.7	11	2.6
25	8	4.2							1	0.3	1	0.1	3	1.4	17	5.2		
26	2	2.2	1	0.7			3	0.2	0		1	0.1	14	4.1	23	7.3		
27					3	0.3			0		2	0.1	8	1.2			0	0
28	0								0				3	0.1				
29					8	1.6			0				2	0.2	0	0		
30	6	1.6							0		0		4	0.5			3	0.3
31					2	0.8			0				12	4.1				
6/ 1									7	2.6	0		3	0.5	4	0.5		
2	1	0.5							0									
3							1	0.8	4	0.2	1	+						
4													2	0.2				
5																		
6																	0	0
7					6	3.1												
Total	70	41.2	52	21.9	64	24.3	106	40.1	103	40.6	189	59.7	171	61.4	141	43.4	182	66.5

Appendix Table 7. Exvessel value of the commercial herring and spawn on kelp harvest, in thousands of dollars, Togiak District, Bristol Bay, 1967-86. 1/

Year	Herring		Spawn on Kelp	Total
	Sac Roe	Food/Bait		
1967	11			11
68	7		8	15
69	4		1	5
70	2		6	8
71 2/			8	8
1972	4		9	13
73	2		2	4
74	24		19	43
75	9		22	31
76 2/			127	127
1977	447		116	563
78	2,635		120	2,755
79	6,561	180	249	6,990
80	3,055	150	95	3,300
81	3,988	1	250	4,239
1982	6,070	105	176	6,351
83	10,450	67	284	10,801
84	7,178	33	203	7,414
85	13,696	41	2/	13,737
86	8,648	12	187	8,847
20 Year Average	3,488		105	3,263
1967-76 Average	8		22	27
1977-86 Average	6,273	74	187	6,500

1/ Exvessel value is the value paid to the fishermen derived from price per pound times commercial harvest.

2/ No fishery was conducted.

(Source: 1)

ALASKA BOARD OF FISHERIES
BRISTOL BAY HERRING MANAGEMENT DIRECTIVE

THE BRISTOL BAY HERRING AND HERRING SPAWN ON KELP FISHERY WILL BE MANAGED WITHIN THE FOLLOWING GUIDELINES:

1. A MINIMUM THRESHOLD LEVEL OF BIOMASS FOR CONSERVATION OF THE STOCKS WILL BE MAINTAINED;
2. DIFFERING HARVEST RATES FOR OLDER AND YOUNGER AGE CLASSES (5 YRS. OR GREATER AND 4 YRS. OR LESS) HERRING WILL BE USED;
3. THE COMMERCIAL HARVEST WILL NOT BEGIN UNTIL THE START OF SPAWNING, THUS ENSURING THE OPPORTUNITY FOR THE HIGHEST ROE RECOVERY; AND
4. THE HARVEST MANAGEMENT SHOULD MINIMIZE WASTAGE OF THE RESOURCE.

THEREFORE, THE DEPARTMENT STAFF WILL TAKE THE FOLLOWING ACTION GIVEN THE SPECIFIED CIRCUMSTANCES:

1. WHEN THE TOTAL DAILY OBSERVED BIOMASS OF EARLY SEASON OLDER AGE CLASS HERRING EXCEEDS 5,000 METRIC TONS, AND SOME SPAWNING HAS OCCURRED, THE SEASON WILL OPEN AND THE HARVEST RATE WILL BE FROM 10% TO 20% OF THE OBSERVED BIOMASS;
2. WHEN THE TOTAL OBSERVED BIOMASS OF LATER SEASON YOUNGER AGE CLASS HERRING EXCEEDS 20,000 METRIC TONS, A HARVEST RATE OF UP TO 20% WILL BE ALLOWED;
3. THE NUMBER OF OPENINGS ALLOWED IN THE HERRING SPAWN ON KELP FISHERY WILL BE BASED ON THE FISHING TIME IN THE HERRING FISHERY, AND DENSITY AND DISTRIBUTION OF OBSERVED SPAWN;
4. WHENEVER POSSIBLE, OPENINGS FOR BOTH GEAR TYPES SHALL BE INITIATED AT LOW WATER, OR THE BEGINNING OF THE FLOOD TIDE;
5. WHENEVER POSSIBLE, SEPARATE OPENINGS SHALL BE ANNOUNCED FOR GILL NETS AND PURSE SEINES;
6. WHENEVER POSSIBLE, GILL NETS SHALL BE ALLOWED TO FISH FIRST AND ALL OPENINGS SHALL BEGIN DURING THE HOURS OF DAYLIGHT;
7. WHEN PURSE SEINE OPENINGS ARE ONE HOUR OR LESS, GILL NET OPENINGS SHALL BE AT LEAST FIVE HOURS IN DURATION;
8. IN EMERGENCY SITUATIONS SUCH AS PENDING BAD WEATHER OR A LIKELY LOSS OF ROE RECOVERY DUE TO FURTHER DELAY, THE STAFF SHALL TIME OPENINGS AS THE SITUATION REQUIRES; AND
9. LATE SEASON (POST-PEAK) HERRING OPENINGS AT TOGIAC SHALL BE BASED ON ONE OR MORE OF THE FOLLOWING CRITERIA:
 - A. A DEFINABLE INCREASE IN THE BIOMASS OF HERRING PRESENT ON THE FISHING GROUNDS.
 - B. A MAJOR SHIFT IN THE AGE COMPOSITION OF THE SAMPLES IN A DEFINABLE BIOMASS THAT IS LARGE ENOUGH TO ALLOW A HARVEST.
 - C. A MAJOR IMPROVEMENT IN THE ROE MATURITY OF FISH SAMPLED OVER A BROAD AREA, INDICATING THE ARRIVAL OF A QUANTITY OF "NEW" HERRING.

IT IS THE EXPRESSED INTENT OF THE BOARD TO FULLY UTILIZE HARVESTABLE SURPLUSES IN THE INSHORE FISHERY.

